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NEWSPAPER

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The InteropNet℠ is a world-class demonstration of top enterprise networking technologies connecting over 500 exhibitors and providing access to the Internet. InteropNet highlights at the Atlanta event include multipoint video over ATM, ATM edge devices, OC-12 (622 Mbps) ATM links, 100baseT and 100VG exhibitor networks deployed next to Ethernet and Token Ring, Fast Ethernet and VG AnyLAN. Tours of the InteropNet revolve around the Network Operations Center (NOC). It's the nerve center of the network from which all activities are monitored and managed. Walking tours sponsored by Network Computing.

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Running concurrently with NetWorld+Interop, Interop DotCom's business Internet/intranet exhibition shows you everything you need to deploy an intranet, create intranet applications and migrate resources to an intranet.

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- DotCom Demos—product demonstrations and how-to advice
- Web Search Engine Challenge–which is most powerful?
- Hourly Netscape Hands-On Intranet Tutorials

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THU, SEPT. 19 9:30am–6pm • FRI, SEPT 20 9:30am–4pm

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Exhibition: Sept. 18–20, 1996
Conference: Sept. 16–20, 1996
Georgia World Congress Center
Atlanta, Georgia

KEYNOTE SPEAKERS

September 18 • Wednesday • 9:00 am–10:00 am
Evolution or Revolution? The Future of Network Computing
Dr. Eric Schmidt
Chief Technology Officer, Sun Microsystems Inc.

September 18 • Wednesday • 12:15 pm–1:15 pm
The Center of Gravity for the Internet: Server or Desktop?
Dr. Irving Wladawsky-Berger
General Manager, Internet Division, IBM Corporation

September 19 • Thursday • 9:00 am–10:00 am
Accessing the Next Generation Internet
Dr. Laurence G. Walker
Vice President, Digital Equipment Corporation

September 20 • Friday • 9:00 am–10:00 am
Convergence of the Internet and Intranet Technologies: The Impact on Businesses
Roel Pieper
President and Chief Executive Officer, Tandem Computers Inc.

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"Test Drive" the convergence of voice and data at an enterprise level, using converged network management and QOS port configuration for real-time communications. Learn how to implement voice/data convergence tools for tomorrow's multimedia applications. Sponsored by Mitel Corporation, Madge Networks and Decisys. First-come, first-served! Pre-register today at www.mitel.com or call 800-331-9740.

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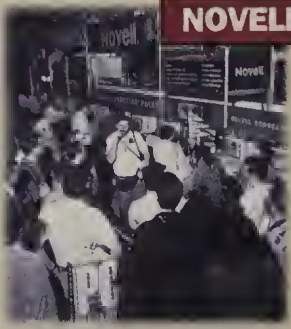

Your personal messaging system on the Internet, Novell Connecting Points let you send and receive email from convenient locations in the convention center and at conference hotels. Your free GroupWise account password will be printed on your badge and allows you to communicate to anyone at the event or to users outside the GroupWise system.

LIVE PRODUCT TESTING

An industry first, see products run Ethernet-to-Ethernet, Ethernet-to-Fast Ethernet and Ethernet-to-ATM switch testing. Results will be presented with categories including best congestion avoidance, best throughput, lowest latency and best-in-class. Results will be compared and displayed.

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AUGUST 12, 1996 VOLUME 13, NUMBER 33

NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

Router wrangle

Bay, Cisco and 3Com square off in the lab. Page 35.

Directories go global

Lotus' SoftSwitch group plots meta directory product.

By Barb Cole

Until now, only little companies with names such as Zoomit have pledged to develop meta directories. But Lotus Development Corp. is looking to change that next year when it crafts a directory of directories out of its SoftSwitch message switch technology, company officials said last week.

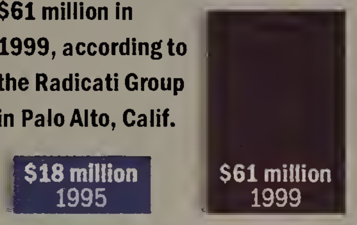
The product will have all the features and robustness of a dedicated E-mail or network operating system directory, but will be designed to integrate such existing systems, according to David Goodman, directory strategist at SoftSwitch.

The SoftSwitch meta directory offering will go beyond simply letting users access information from disparate directories, Goodman said. It will also be able to recognize who owns the data held in them, he said.

Such a capability is key to constructing a meta or global directory, Goodman said. It could

See SoftSwitch, *page 10*

The worldwide market for directory synchronization products is set to grow from $18 million last year to $61 million in 1999, according to the Radicati Group in Palo Alto, Calif.



Failure to report break-ins offers a license to hack

By Chris Nerney

Your company's computer system has been invaded. Some files are missing, your electronic mail has been read, and next year's secret marketing plan may be sitting on a competitor's desk.

As CEO, you should:

A) Fire the network manager.

B) Quietly assess the damage, learn from your mistakes and move on.

C) Immediately contact the appropriate law enforcement authorities.

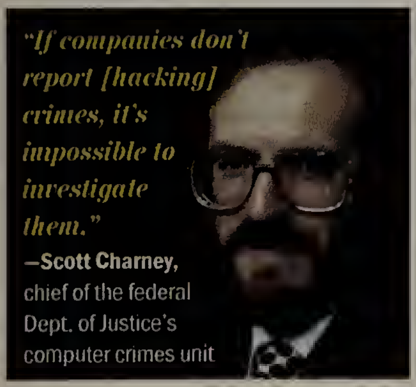
D) Lament your fate in a pitiable display of self-loathing and shame.

Though "C" might often be the right answer, surveys show — and experts confirm — that few companies will bring public investigators into the picture.

This reluctance to come forward makes it difficult to combat computer crime, say investigators and network security specialists.

"If companies don't report crimes, it's impossible to investigate them," said Scott Charney,

See Law, *page 10*



"If companies don't report [hacking] crimes, it's impossible to investigate them."

—Scott Charney, chief of the federal Dept. of Justice's computer crimes unit

NEWSPAPER $5.00

Access Network World Fusion using the number in yellow. See page 5 for details.

Cisco and Madge split

Cisco takes different token-ring switch path with proposed $100M buyout of Nashoba.

By Jim Duffy

San Jose, Calif.

Cisco Systems, Inc.'s acquisition of token-ring switch maker Nashoba Networks, Inc. will conclude Cisco's arrangement with Madge Networks, Inc., an alliance that gradually unraveled over the past 17 months.

Cisco last week said it will purchase privately held Nashoba for $100 million in stock and start selling Nashoba's Concord token-ring backbone switch as the Catalyst 1800.

But Cisco already offers a token-ring backbone switch called the Catalyst 1600, which is a private-label version of Madge's Smart Ringswitch. This was the first — and apparently only — result of a "strategic" development partnership between Cisco and Madge that was disclosed more than a year ago (*NW,* March 20, 1995, page 1).

Under that agreement, Cisco licensed Madge's RingRunner technology to develop a line of token-ring switching products for LAN backbones, servers and clients. Those products were to include a token-ring switching module for Cisco's Catalyst 5000

See Cisco, *page 57*

TOKEN GESTURES

Sources of Cisco's switched and shared-media token-ring technology

Source	Product	Status
Nashoba	Catalyst 1800 backbone switch	Available in September
Madge	Catalyst 1600 backbone switch	Shipping; no further development planned
IBM	Catalyst 2600 workgroup switch	Shipping; limited life expectancy
Olicom	Switched Access Unit (SAU), Catalyst 5000 token-ring modules	Available mid-1997; SAU to replace Catalyst 2600
LanOptics	Cisco 2517 router/hub; AccessPro PC Card router	Shipping; relationship intact

Click over to Network World Fusion for more info, including:

- Articles on Cisco's StrataCom and Telebit acquisitions
- A review of token-ring switches from Nashoba, Madge and 3Com
- The latest Cisco stock price

Select News+. NetworkWorld Fusion http://www.nwfusion.com

Window opened into BackOffice

By Christine Burns

Santa Clara, Calif.

A start-up here is readying a product suite that will enable companies to centrally monitor Windows NT servers running Microsoft Corp. BackOffice, as well as break out performance information about individual applications.

NetiQ Corp. officials claim the company's AppManager Suite 1.0 — to be announced in two weeks — can replace the

See NetiQ, *page 56*

PROFILE: NetiQ AT A GLANCE

Headquarters:	Santa Clara, Calif.
Founded:	1995, by Ching-Fa Hwang and Her-Daw Che
Financials:	Privately held
Primary product:	NetiQ AppManager Suite, a Microsoft BackOffice management product
Employees:	Less than 20
Website:	http://www.netiq.com

A Network World Supplement
August 1996
IntraNet magazine
Star power
How the right Web server can energize your intranet world
Also inside
• Intranet shines at Sun
• Review: NetWare Web Server
• Of policies and intranets
• Knowing your Web whereabouts
• Managing documents, Web style
Capitalizing on Internet Technology

In this issue:

- Web server strategies
- Intranet shines at Sun
- Review: NetWare Web Server
- Of policies and intranets
- Knowing your Web whereabouts
- Managing Web documents

Starts after Page 30.

In-Site

Accounting firm adds Web to its Lotus Notes net

By Barb Cole

New York

Coopers & Lybrand will soon be feeling the Domino effect.

Once the Big Six accounting and consulting firm begins deploying Domino — Lotus Development Corp.'s answer to doomsayers who predict that Notes will be overrun by the Web — barriers to information retrieval will start to topple. Clients and employees that currently cannot access a huge selection of Coopers & Lybrand data locked in Notes servers will suddenly gain access via their Web browsers.

"Nine months ago, we were really struggling with the Notes vs. Web issue," said Alan Baren, a manager in the strategic technology group at Coopers & Lybrand, which has now essen-

See Domino, *page 56*

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- 6X SCSI CD-ROM
- SafeSite Server Management Software
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NetworkWorld Fusion

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This Week

News+

- **Directories:** Read up on new directory technologies, such as meta directories, LDAP and ODSI. We provide a series of articles and links on the topic.
- **Lotus Notes:** Download our review of Lotus' new Domino server and follow links for more info on other Dominos, from Fats to the theory.
- **Switching:** Get overviews of Cisco's acquisitions and deals in the switching arena, and read a review of token-ring switches from Madge, Nashoba and 3Com.
- **Hackers:** We've compiled a set of tips for reducing the chances of a hacker breaking into your internal network to go with our Page 1 article about hacker intrusions.
- **NetWare:** Download our review of five tools for enhancing Novell Directory Services.
- **Call centers:** Read one consultant's recommendation for integrating your call center and the Web.
- **Intranets:** Looking for tools to start building an intranet? We'll provide you with a series of links and articles to help you find the right ones.

NetRef

To accompany our article on the impact of telecommunications reform (page 39), we've assembled a collection of our past articles on the topic, which will help explain the impact of the new law on you and your telecom bills. From the main NetRef menu, select Technology Resources then WAN Services.

this week's pick

Need help with OS/2? There's often no better place to seek advice and ideas than from a local user group. IBM maintains a list of OS/2 user groups across the U.S. and Canada at http://www.austin.ibm.com/pspinfo/pcuggrp.html.

HOW TO GET ON TO NETWORK WORLD FUSION

At the welcome screen, click on Registration and follow the instructions. Subscribers, keep your NWF number — highlighted on the front cover's mailing label -- handy during registration. Non-subscribers must fill out an online registration form.

NetworkWorld Fusion

PICK OF THE WEEK

Hot Topic

New: Look up Network World articles organized by company. Select News+ then Industry.

NetworkWorld
An IDG Publication

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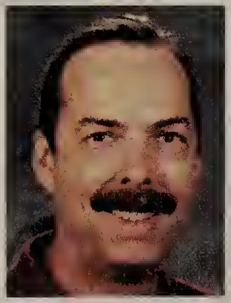

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Features

NetworkWorld TEST ALLIANCE

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A whole new game: *Telecom players want your business – all of it. Page 39.*

Network Help Desk. *Page 31.*
Message queue. Letters to the editor. *Page 33.*
Editorial and advertiser indexes. *Page 55.*

NetworkWorld's *Mission: To provide news and analysis that help network IS professionals deliver the network computing infrastructure and distributed applications required to meet evolving business needs.*

News briefs, August 12, 1996

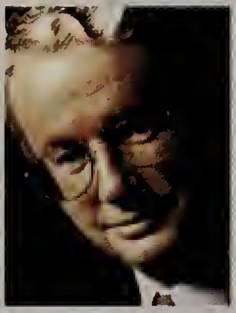
Microsoft launching new browser

■ Tonight in San Francisco, Microsoft Corp. will launch its Internet Explorer 3.0 browser, featuring support for Java, ActiveX, HTML 3.2, cascading style sheets and a ratings system that lets users screen out objectionable content. Microsoft plans to make Explorer 3.0 available for download at midnight. Rival Netscape Communications Corp. is expected to ship the third version of its Navigator browser soon.

Making the Web secure

■ The Open Group Research Institute in Cambridge, Mass., last week released technology for building secure enterprise Webs. The technology, part of the Distributed Computing Environment, includes a server that supports secure DCE Web protocols and has an access control list feature that protects Web documents. Dascom, Inc. and Gradient Technologies, Inc. have announced products based on the technology.

Let's be Frank-enberg


Novell's *Frankenberg*

■ In a recent memo obtained by *Network World*, Novell, Inc. Chief Executive Officer Robert Frankenberg directed all 6,000 company employees to become a marketing force in the fight to contain Microsoft Corp.'s assault on Novell's market share. "We've played defense long enough. You are to take the offensive," he wrote. Frankenberg ordered employees to push the four "Power Brands": NetWare, GroupWise, ManageWise and Novell Internet.

BEA all you can be

■ BEA Systems, Inc. of Sunnyvale, Calif., last week released BEA Jolt, client and server software for linking Java-enabled Web browsers to back-end data and applications through BEA's Tuxedo middleware product. The technology gives Web applications a wide range of performance, security, messaging and transaction integrity features.

Tivoli to rally troops

■ IBM's Tivoli Systems, Inc. will announce this week its 10/Plus Association developers program designed to foster the creation of integrated multivendor management applications for the IBM/Tivoli TME 10 management platform. The association includes more than 40 companies, such as Boole & Babbage, Inc.

Bay takes remote control

■ Bay Networks, Inc. last week rolled out a frame relay access device (FRAD) for small offices. The FRAD 630 is an access router that connects LAN and Synchronous Data Link Control devices to corporate nets over frame relay. It features one Ethernet connection, one SDLC link and one T-I frame relay interface. It costs $1,395 and is available now.

The FCC fills up

Keeney *named to FCC*

■ President Clinton has named veteran regulatory lawyer and congressional aide Regina Keeney to the Federal Communications Commission. As chief of the FCC's Wireless Bureau in 1994 and 1995, Keeney ran the first personal communications services license auctions, and as chief of the Common Carrier Bureau this year, she oversaw the just-completed local interconnection rules.

Making the CDPD connection

■ AT&T Wireless Services, Inc. last week signed its third big intercarrier deal with another cellular provider. The company is hooking its Cellular Digital Packet Data network to that of Bell Atlantic NYNEX Mobile, allowing the two companies' customers to roam among each others' licensed territories for the same per-packet price beginning this month.

Novell joins Webbed NOS ranks

Firm rolls out open beta with free Web server, aims for larger role on corporate intranet.

By Christine Burns
Orem, Utah

Timing is everything.

Last week, Netscape Corp. raised a ruckus with the Department of Justice about the way Microsoft Corp. plans to bundle NT and its Internet server (see editorial, page 32).

At nearly the same time, Novell also announced plans to bundle its own Web server with the next release of NetWare. When NetWare 4.11, formerly referred to as Green River, ships this fall, it will include NetWare Web Server 2.5 gratis.

Novell's *Donahoo says many NetWare LANs lack certain 'Net technologies.*

"There are 3.5 million NetWare LANs out there ready to be instant intranets, but they currently lack some of the Internet technologies," said William Donahoo, senior director of product marketing at Novell. By bundling the Web server with NetWare, as well as including support for HTTP, HTML and integrated TCP/IP in NetWare 4.11, users get a ready-made intranet offering, he claimed.

Wide open beta

Novell's announcement came as part of a larger one in which the company formally released the NetWare 4.11 open beta. Other features of NetWare 4.11 include a graphical tool to better manage Novell Directory Service, symmetrical multiprocessing support and C2-level network security. Novell expects more than 70,000 beta copies to be downloaded from the Web. Copies are available at http://netware.novell.com/river/.

Users have pressured Novell to give its Web server away since Microsoft began freely distributing its Internet Information Server over the Web last December. Prior to last week's announcement, Novell sold NetWare Web Server as a separate NetWare Loadable Module for $995.

Don Gross, a network technician with Holman's of Nevada, a construction services firm in Las Vegas, said he has always had the desire — but not the resources — to install Novell's Web server on his company's NetWare LAN. "Cost was the real barrier, and without it, we will probably set up a Web server when we move to Green River this fall," Gross said.

Rob Enderle, senior analyst with Giga Information Group in Santa Clara, Calif., said Novell is playing catch-up, both in terms of Web server technology and the timing of this announcement. "Novell was very, very, very late to market with its web server, so when it finally did arrive, you would have expected it to be advanced technically. But it wasn't. It's very much a 'me too' product,'" Enderle said.

Donahoo said that although Novell's rollouts of late fall short of Microsoft shipping Windows NT 4.0 and Windows 95, bundling its Web server with NetWare was driven only by customer demand.

©Novell: (800) 200-9140.

SNA migration

IBM expands FEP support of LANs

By Michael Cooney
New Orleans

IBM later this year will add critical tools to its front-end processor line that will help its biggest SNA users evolve their networks into multiprotocol environments.

Company executives, speaking at the recent Share, Inc. user group meeting, said the firm is looking to add support for Fast Ethernet, FDDI and ATM, as well as improved support for its own Advanced Peer-to-Peer Networking technology, to its 3746 Nways Multinetwork Controller Model 950 and enhanced 3746 Model 900.

The features will help users more easily funnel LAN, SNA and APPN traffic to the mainframe while giving the big communications box more competitive weapons to use against vendors such as Cisco Systems, Inc. that are trying to displace front-end processors (FEP) with channel-attached routers.

"It is critical to the FEP's competitive existence that IBM add LAN adapters and TCP/IP support to the 3745 and 3746 as standard attachments for servers tying into the mainframe," said Don Czubeck, president of the GEN2 Ventures consultancy in Saratoga, Calif. "Fast Ethernet is key since so many users are deploying it and it is supported in so many server platforms."

According to IBM's Gilles Garcia, a product line manager

See **FEP**, *page 56*

Building a more flexible FEP

IBM's front-end processor connectivity plans:

3745	
Max. LAN adapters	29
Max. SNA downstream physical units	9,999
Ethernet adapters	16
Token-Ring adapters	29
FDDI	Unspecified
ATM	None
Max. TCP/IP workstations	Unlimited
3746-950	
Max. LAN adapters	21
Max. SNA downstream physical units	500/adapter
Ethernet adapters	Promised
Token-Ring adapters	21
FDDI	Unspecified
ATM	Unspecified
Max. TCP/IP workstations	Unlimited

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Netscape Navigator moves to Win95

By Carol Sliwa

Mountain View, Calif.

The world according to Netscape will now include corporate employees running personal Web sites on Windows 95 desktops.

Netscape Communications Corp. today will release a beta version of its FastTrack Web server for Microsoft Corp.'s Windows 95 platform that will come bundled with Netscape's Navigator Gold client for creating and editing Web pages.

As conceived by Netscape, users will be able to install a Web server in minutes with the help of a series of pop-up screen prompts and a configuration agent, create HTML pages and, with the simple click of a button, publish the content for others to access over the Internet or a corporate intranet.

Since server and client support Java and JavaScript, they also have the ability to create and manage interactive content.

At least for the moment, Netscape will have an edge over rival Microsoft in the desktop arena. Microsoft's Internet Information Server runs only on Windows NT Server, and its Peer Web Services, or personal Web server, are available only on NT Workstation. The company has plans for Peer Web Services on Windows 95, but no availability date has been announced.

"I think there's going to be a market for Web servers on Windows 95 because there's so many [PCs running it] out there," said David Smith, an analyst with the Stamford, Conn.-based Gartner Group, Inc. "But the question is, how are people going to manage it when there are so many of them out there?"

Netscape says network managers can maintain a level of control by remotely administering the Web servers using their Navigator browsers.

"The IS person could be sitting there running a Unix box or a Macintosh box and administer that Windows 95 Web server: Turn it on, turn it off, grant access, set up to install programs, run reports," said David Pann, a Netscape product manager. "Literally anything you can do from your desktop, I can do remotely."

FastTrack for Windows 95, with Navigator Gold included, will sell for $295. General availability is expected in the third quarter.

©Netscape: (415) 937-2555.

Netscape seeks justice

Netscape last week fired off a letter to Microsoft — and a copy to the U.S. Justice Department — saying Microsoft is violating antitrust laws by imposing a 10-connection licensing limitation on Windows NT Workstation. This restriction would impede Netscape's ability to use that platform for its Web server software.

The letter came in response to Microsoft's written demand that Netscape cease and desist by Aug. 15 from publishing an "unfair and deceptive" pricing comparison for Web server solutions.

Netscape, on its Web site, claims its Web server can run on the $319 NT Workstation. Microsoft insists that the $1,129 NT Server, which is bundled with its own server software, is necessary to achieve optimal performance.

According to Netscape, Microsoft is limiting consumer choice by "artificially restricting the product's functionality."

Calling Netscape's attack a public relations move, Microsoft said it has to a do a better job of educating its rival on the differences between the NT Workstation and NT Server products.

— *Carol Sliwa*

AOL outage had many causes

Doesn't help online service credibility for business uses.

By Joanie Wexler

A comedy of errors knocked out service to America Online, Inc.'s (AOL) six million customers last Wednesday.

The confluence of events that felled the $1 billion online service provider's network for 18 hours included human error at an AOL subsidiary, a glitch in AOL data-center router software and, ironically, diagnostic software rendered impotent when the network collapsed.

Such sweeping outages fuel the perception that unmanaged network services are not stable enough for important business data. "AOL obviously didn't have a backup system ready to go," grumbled customer Steven Taylor, president of Distributed Networking Associates in Greensboro, N.C., who has long connected his business to the networked world using AOL.

What happened?

AOL said its ANS subsidiary, which carries most of AOL's traffic, mistakenly changed the format of the routing table that allows AOL hosts to exchange traffic with the ANS backbone.

The error was made while the data center was offline for maintenance, explained Matt Korn, AOL vice president of operations.

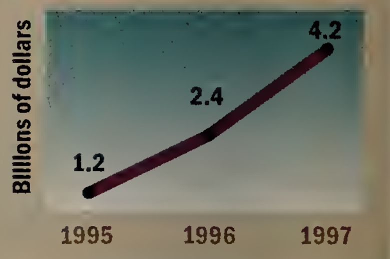
When it was brought back up the network wouldn't run, so the company leaped to the conclusion that the just-completed maintenance was to blame, said Steve Case, AOL chairman.

In addition, the network diagnostic tools AOL uses to troubleshoot the network, "were not operating because they only run on a live network," Korn added.

Avoiding crashes

Players in the Internet industry are feverishly building out their networks to stay ahead of capacity demands and keep outages such as AOL's at bay.

Internet infrastructure Investments (year to date)



SOURCE: THE YANKEE GROUP, BOSTON

To compound matters, the ANS mistake tripped off a software glitch in one of AOL's data-center routers, wreaking further havoc, Korn said.

AOL is stepping up its efforts with ANS and other service providers that carry AOL's traffic to make routing information exchange more reliable, he said.

This is the second nationwide outage to plague users in recent months.

In mid-June, Netcom On-Line Communications Services, Inc.'s routing tables went berserk after traffic destined elsewhere landed on the Netcom backbone by mistake (*NW*, July 1, page 31). It took Netcom 12 hours to reconfigure the routers.

Fortunately, most companies are not using unmanaged network services for mission-critical business because the nets are not yet mature enough, said Kimberly Lorencic, senior analyst at The Yankee Group, a research firm in Boston.

But AOL and Netcom have recently launched special business divisions to take on the corporate market and have to get their acts together if they are to be taken seriously, she said.

For example, AOL last week said it will give all customers a free day of service to make up for the day-long outage, an offer that will cost AOL about $3 million.

To a business customer, "that would be a slap in the face" compared with a lost business opportunity, Lorencic said. ■

NetFRAME gets intranet religion

DG, Unisys, NCR and other server vendors make moves.

By Ben Heskett

Cupertino, Calif.

NetFRAME Systems, Inc. next week will release a Windows NT-based intranet server bundle that includes a collection of powerful tools for simplifying the setup and management of private Webs.

NetFRAME's Ready, Intranet, Go tools include Site Architect, which eases the creation of an intranet; Design Center, a Web publishing utility; and Help Desk tools.

Site Architect differs from something like Microsoft Corp.'s FrontPage Web page authoring tool because it is designed to lay out a blueprint for a company's entire internal Web structure, according to sources. FrontPage is focused on creating individual Web pages.

NetFRAME's offering could prove attractive to customers because it appears to be focused on ease of use, said Jerry Sheridan, an analyst with Dataquest, Inc., a San Jose, Calif.-based consultancy. But whether customers want such a high-end server for intranet applications is another question, he said.

The hardware piece of the bundle is a Pentium processor-based ClusterServer 8560is with 64M bytes of ECC memory and 4.2G bytes of storage, with room to scale to a four-way symmetric multiprocessing (SMP) architecture.

In other server news:

■ Data General Corp. and Unisys Corp. have agreed to share server technologies, with Unisys gaining DG's Scalable Coherent Interface (SCI)-based Non Uniform Memory Access (NUMA) technology to use in high-end Pentium Pro-based systems. DG garners Synchronous Coherent Memory (SCM) bus technology from Unisys to refresh its eight-way 5800 SMP server line.

NUMA allows several Pentium Pro SMP boards to be tied together via an SCI-based hardware link. SCM lets as many as 10 Pentium Pro processors compute tasks on one bus, as opposed to the current standard limit of four processors.

NUMA-based systems from DG and Unisys are expected by July of next year. DG is expected to introduce SCM-based systems in six to 12 months.

■ NCR Corp. last week announced its Pentium Pro WorldMark servers can scale to more than 4,000 processors using an interconnect technology called ByNet.

Taking advantage of NCR's SMP Utilization Manager, as well as its Top End and LifeKeeper middleware for transaction monitoring and high availability, the NCR servers are among the first Windows NT-based machines that scale beyond eight processors.

The new models are available now with 166-MHz Pentium processors and will be upgraded to Pentium Pro processors by year-end.

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Law

Continued from page 1

chief of the Department of Justice's computer crimes unit.

He cited a recent joint survey by the Computer Security Institute and the FBI in which less than 17% of organizations responding said they would report known network break-ins to law enforcement officials. Of those, more than 70% said they feared negative publicity (see graphic).

Schwartau *says firms fear loss of control when authorities get involved.*

According to Charney, the importance of notifying law enforcement about computer invasions extends beyond individual cases. "In a broader sense, we need full and complete reporting to understand the scope of the problem," he said.

Is silence golden?

While security experts and law enforcement officials say it makes their jobs harder, they acknowledge that keeping quiet about network intrusions often makes sense from a corporation's viewpoint.

"Companies approach this from a risk perspective," said Ira Winkler, director of technology for the National Computer Security Association.

The perceived costs of going public about a network invasion, Winkler said, often seem greater to executives than any losses from the incident.

Besides potential damage to the company's image, many corporate executives whose systems have been hacked are afraid of being sued by shareholders who would allege they didn't adequately protect the company's network.

"We have been consulted by companies that have been hacked, and I know they worry about this," said Erika Koster, an associate attorney with the Minneapolis law firm Oppenheimer, Wolff and Donnelly.

Companies are also reluctant to contact authorities because they're afraid they'll lose control of the investigation, said information security consultant Winn Schwartau, president of Interpact, Inc.

How secure is your network?

The 1996 Computer Security Institute/FBI Computer Crime and Security Survey was sent to security personnel at corporations, government agencies and universities throughout the U.S. Responses were received from 428 organizations.

- 42% of respondents experienced some form of intrusion or unauthorized use of computer systems within the past year.
- More than 50% of those who experienced intrusions or attempted probes of their computer systems traced those efforts to employees.
- More than 50% cited U.S. corporate competitors as a likely source of attacks ranging from eavesdropping to system penetration.
- The biggest concern of respondents regarding eavesdropping and system penetration centered on independent hackers and external information brokers as likely sources. Disgruntled employees and corporate competitors were the next most significant concern.
- More than 50% of respondents have no written policy on dealing with network intrusions.
- More than 60% have no policy for preserving evidence for criminal or civil proceedings.

"The minute you bring in law enforcement, your options decrease exponentially," he said. "Law enforcement's goal is to be able to prosecute. They have to develop forensic evidence that will hold up in court."

In certain cases, that has required that prosecutors seize the original computer and data files for use in a trial. This potential disruption of business can dissuade companies from bringing charges.

WHAT TO DO IF YOU'RE HACKED

- Try to figure out the scope of the incident. If your company is unable to adequately investigate internally, contact corporate lawyers.
- If you decide to cooperate with law enforcement officials, do so fully. Anything less will hinder their investigation, wasting their time and perhaps your money.
- Solve whatever security problem you had.
- If your company didn't have a computer security policy, develop one and stick to it.

Some states have passed laws that urge companies to come forward about network intrusions.

A Minnesota statute enacted two years ago requires anyone with knowledge of a network intrusion to report it to authorities, Koster said.

In return, they would be protected from being "sued for vicarious liability," according to Koster. "It's sort of a safe harbor," she said.

And Massachusetts passed new computer crime laws last year that include a clause allowing electronic copies of corporate files to be admissible as evidence.

On the federal level, Charney said prosecutors and investigators "have made considerable progress" in persuading organizations to report network invasions.

"The FBI now has three computer crime units [in Washington, D.C., New York and San Francisco], and there are prosecutors who specialize in computer crimes in every U.S. Attorney's office," he said.

This increase in resources and expertise has made it easier for law enforcement officials to investigate cases without sparking corporations' worst public relations and liability nightmares. "We have done some very big cases with some very big companies in such a way that it didn't expose them to those concerns," Charney said.

He also said companies are becoming more willing to work with investigators because they are beginning to realize that a strategy of denial is self-defeating.

"There is a growing awareness among industry that this is a joint problem, and when you don't report a hacker attack, it doesn't mean the hacker goes away," Charney said. "But we still have long way to go." ■

Getting civil with hackers

Companies whose network systems have been invaded can press criminal charges against alleged perpetrators — and some have.

Hacking victims are equally entitled to file civil lawsuits against violators. But that has not happened, even though network intrusions increasingly are motivated by financial gain and industrial competition rather than intellectual curiosity or techno-whiz ego.

"Hackers are growing up, and they realize they can make money doing this. It's more and more likely that hackers are working for competitors," said attorney Peter Adler, a partner in the Minneapolis law firm Oppenheimer, Wolff and Donnelly.

Adler's firm is offering its services to companies that want to sue hackers. While acknowledging that "we're a little ahead of the game here," he argues that lawsuits are inevitable as the hacking stakes continue to grow.

However, one security consultant warns that the civil route is fraught with peril.

"Companies should really consider the implications of a civil trial," said Ira Winkler, director of technology for the National Computer Security Association. "You can recover some money, but the damage a lawsuit can do to a company's image can be devastating."

A great danger of pursuing a lawsuit, Winkler said, comes in proving monetary losses.

If you're suing a competitor, that competitor can subpoena your corporate records, opening them to scrutiny by defense lawyers and — since civil trials are public record — the rest of the world.

Winkler also said the idea of filing lawsuits against younger hackers who aren't engaged in espionage for a competitor or stealing cash is "barking up the wrong tree because these people don't have any money."

Security consultant Winn Schwartau agrees, though he says that doesn't mean someone won't eventually try.

"What's going to end up happening is some attorney will say, 'Let's do a test lawsuit against this hacker to see if his parents have any money.'" Schwartau said.

— Chris Nerney

SoftSwitch

Continued from page 1

enable, for instance, a company to blend its messaging directory information with data from a human resources application directory without exposing confidential employee information. It could also resolve glitches that arise when several directories hold conflicting information, he said.

> *"There is pent-up demand for scalable, reliable directory services at the enterprise level. SoftSwitch definitely has enterprise credibility," Intel's Mark Smith said.*

Goodman said the design goal of the SoftSwitch meta directory is to support any application, including Notes and its competitors Microsoft Corp.'s Exchange and Novell, Inc.'s GroupWise. Support for major network operating systems, including NetWare and Windows NT, is also planned. Goodman declined to specify which platforms the meta directory will run on, but said it will support Web clients.

The meta directory is expected to support the Lightweight Directory Access Protocol as a means of gleaning information from other directories, but the core will be based on X.500, Goodman said.

In entering the meta directory space, SoftSwitch hopes to build on its existing product line of directory synchronization products, already widely used in large companies.

SoftSwitch's message switch offerings convert messages, addresses and file attachments between Simple Mail Transfer Protocol, X.400, Systems Network Architecture Distribution Services and PROFS E-mail.

Goodman said SoftSwitch's experience in the enterprise messaging arena will help differentiate it from others that have announced plans to sell meta directories, including Worldtalk, Inc. and Zoomit International, Inc.

Users said meta directories are sorely needed. "There is pent-up demand for scalable, reliable directory services at the enterprise level," said Mark Smith, manager of messaging strategies at Intel Corp. "SoftSwitch definitely has enterprise credibility."

Analysts are also high on meta directories, but questioned whether SoftSwitch, now a part of IBM, could build such a tool.

"Internally, [IBM] has a lot of competing [directory] technologies," said Sara Radicati, president of The Radicati Group, a Palo Alto, Calif.-based consultancy. Radicati and other analysts pointed out that IBM lacks a unified directory across its own 3090, Application System/400, RS400, Lotus Notes and cc:Mail product lines. ■

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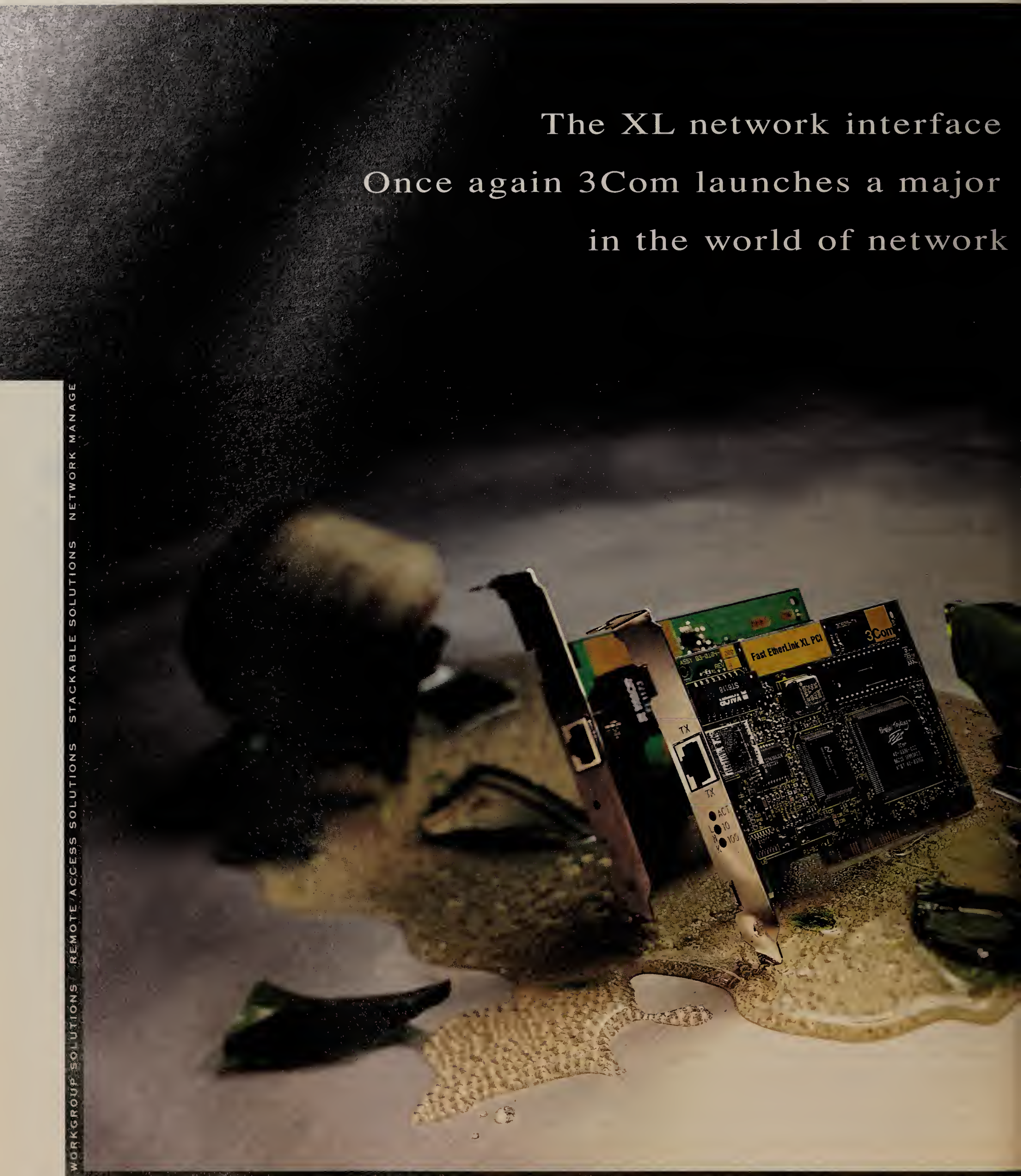
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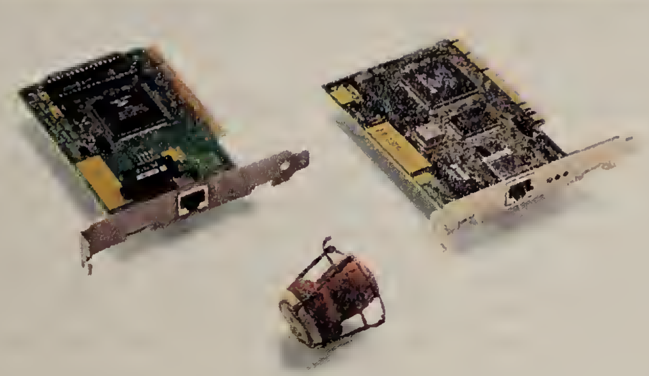

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Vendors to ready client/server bundle

Qualcomm's Eudora client to be packaged with Software.com server.

By Barb Cole
San Diego

Qualcomm, Inc. and Software.com, Inc. this week will announce a partnership under which they will pair their Internet mail products to form a client/server bundle.

The companies' products make a good fit in that Qualcomm offers souped-up versions of Eudora, the popular Internet mail client, and Software.com sells an Internet mail server.

Qualcomm's Eudora division will license Software.com's Post.Office mail server. The bundle, due out by year-end, is expected to run on Windows NT and Unix servers and support Windows and Macintosh clients. The companies expect to codevelop additional products down the road but declined to provide specifics.

The partnership is designed to help the vendors fend off messaging industry veterans such as Lotus Development Corp., Microsoft Corp. and Novell, Inc., all of which are racing to add support for 'Net protocols to their products.

Analysts said the partnership should help Qualcomm penetrate more business accounts. To date, the company has been most successful in selling Eudora to the consumer marketplace.

"As the business market turns toward the [Internet messaging] paradigm, Qualcomm has an opportunity because it is well-known and has a pure Internet client," said Daniel Blum, principal in the Washington, D.C. office of Rapport Communication, a market research firm and consultancy.

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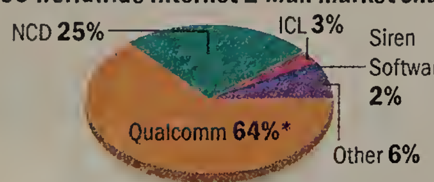
QUALCOMM LEADS THE PACK

1995 worldwide Internet E-mail market shares



Based on 1.9 million installed E-mail boxes

* This figure refers to Eudora Pro, not Eudora Light.

SOURCE: IDC, FRAMINGHAM, MASS.

Pilot steers OLAP tool toward Web

By Ellen Messmer

Pilot Software, Inc. today will air plans to begin Web-enabling its decision support software so end users can access analytical data using a browser rather than proprietary client software.

By year-end, the company plans to ship the Windows NT-based Pilot Internet Publisher, which will convert output from the Pilot Decision Support Suite online analytical processor (OLAP) into HTML format.

Users will be able to get simple reports over the Internet or corporate intranet using a Web browser, said John Fleming, Pilot's vice president of marketing. "This simplifies the problem of distributing client software," he said, adding that the Pilot OLAP decision support tool already has more than 100,000 users worldwide.

Although employing a basic HTML Web browser to access the OLAP system will not allow for sophisticated queries, users will be able to use Java- or ActiveX-enabled browsers for more complex business data analysis. Java and ActiveX will give Web browsers a lot of capabilities found in Pilot's own client software, Fleming said.

The Pilot Internet Publisher, expected to cost $10,000, will also adhere to standard IP protocols such as File Transfer Protocol, so users can simply snap out sections of a database and download them onto a PC for later review, Fleming said.

Tim Case, vice president of pharmaceutical firm Comb, Inc., which uses the Pilot Decision Support Suite, said the Internet extensions should aid the company's mobile sales force in particular.

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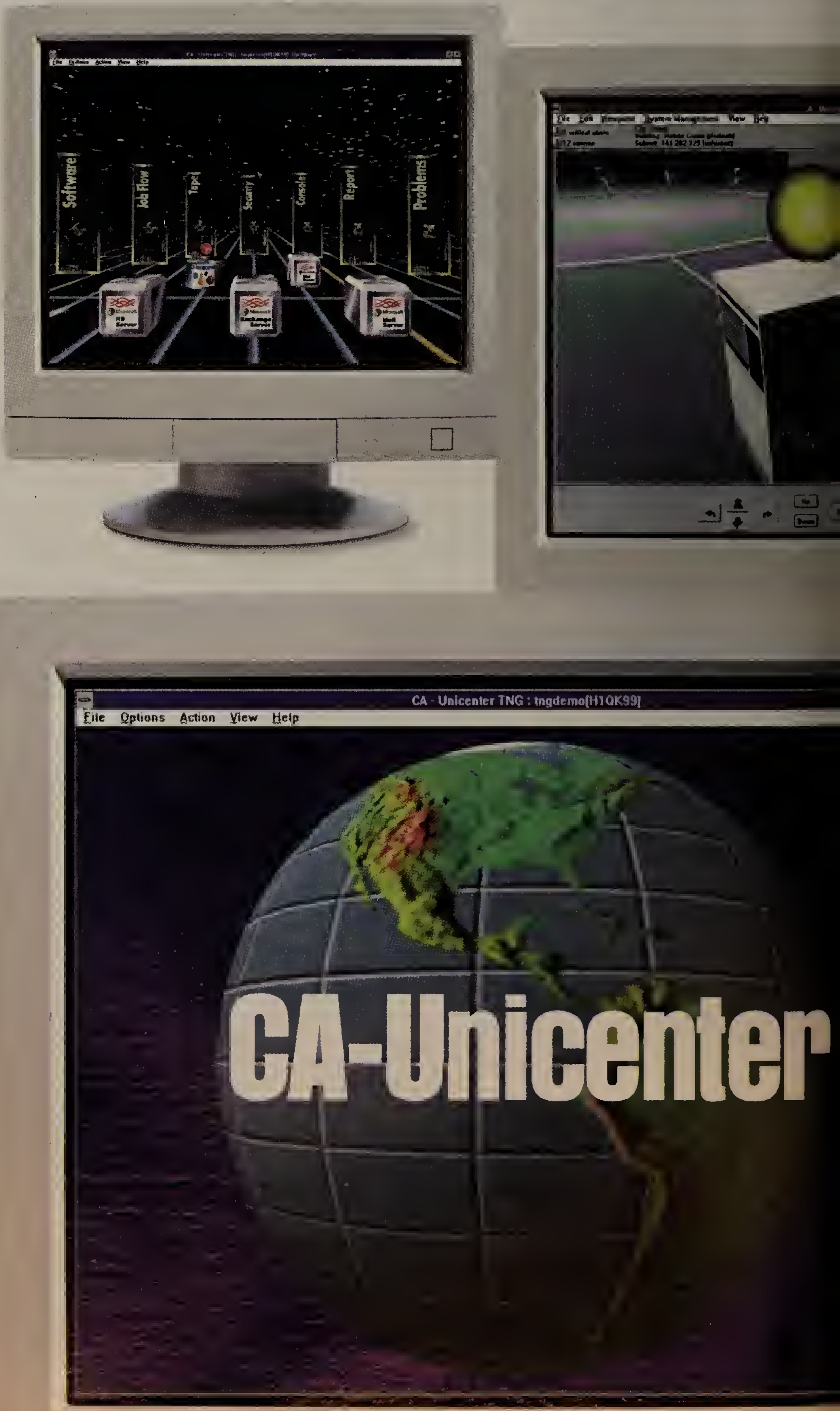
Software
Job Flow
Tape
Security
Console
Report
Problems
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File Options Action View Help
CA-Unicenter

Hybrid frame relay-ATM networks just got easier

Improved multiplexers ease customer equipment worries when building ATM frame relay backbones.

By Tim Greene

ADC Kentrox last week announced enhancements to its ATM mux that will help carriers improve services that enable enterprise sites fed by frame relay pipes to communicate with sites supported by ATM.

Upgrades to Kentrox's AAC-3 ATM multiplexer allow full frame relay-to-ATM translation within the multiplexer. Earlier versions of the product required a router in the user's network to complete the transaction.

According to Hardi Mann, broadband product manager for Ameritech Corp., moving all the translation into the carrier cloud will relieve users of the need to think about mixing and matching frame relay and ATM devices.

"With full translation, a customer can feel confident his frame relay products are going to be able to talk to his ATM products," said Dan Murray, ADC Kentrox's broadband program manager. "Previously, they had to do a lot of research to ensure compatibility."

Jay Pultz, a research director with Gartner Group, Inc. in Stamford, Conn., said frame relay-to-ATM service interworking is attractive because it allows users to base networks on public frame relay services and bring ATM up on a site-by-site basis as needed. "It protects the frame relay investment that's already been made," he said.

In addition, devices such as the AAC-3 should reduce carrier provisioning costs. The AAC-3 can concentrate traffic from many sources onto one ATM line, and it sits at the edge of the carrier network, feeding the more expensive ATM switch deeper in the network.

MORE CUSTOMER OPTIONS

Devices supported by the initial release of ADC Kentrox's AAC-3 ATM access multiplexer: Routers.

Devices supported by AAC-3 with frame relay-to-ATM translation: Routers, most frame relay access devices, network interface cards, DSUs/CSUs and switches.

Mann said translation is not a concern if the carrier is already using network switches that provide frame relay-to-ATM service interworking, such as Cascade Communications Corp.'s B-STDX switches within the Ameritech network.

But Ameritech also has switches that are incapable of the translation and require a multiplexer such as the AAC-3 to cut frames into cells, Mann said.

The AAC-3 improvements will help ensure that users receive the same functionality throughout the Ameritech net, he said. Noting that the AAC-3 is an early product with this feature, he also said he is optimistic other products will start to crop up and prices will drop. "That will let our customers get this type of capability at lower cost," Mann said.

Finding a cost-effective way to provision the service has been among the stumbling blocks carriers face in offering the service (*NW*, July 15, page 22).

The AAC-3 translation features, a software change, will be available in September, as will a frame relay module for the AAC-3 that will have four, rather than two, 1.55M bit/sec frame relay ports.

Other enhancements include a four-port circuit emulation card, and mapping of frame relay link management to ATM operations, administration and management cells, permitting management across ATM-frame relay networks. Software upgrades can now be done either over the local Ethernet port or in-band using Trivial File Transfer Protocol.

Pricing for the AAC-3 will range from $10,000 to $60,000, depending on the configuration.

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Charlotte, NC	Oct. 21
Chicago, IL	Sep. 11
Cincinnati, OH	Aug. 15
Cleveland, OH	Dec. 10
Columbia, SC	Oct. 18
Columbus, OH	Aug. 12
Dallas/Ft. Worth, TX	Oct. 18
Denver, CO	Sep. 12
Des Moines, IA	Sep. 27
Detroit, MI	Dec. 5
Edmonton, Alb., Can.	Dec. 5
Houston, TX	Oct. 21
Indianapolis, IN	Sep. 9
Irvine, CA	Nov. 6
Jackson, MS	Oct. 15
Jacksonville, FL	Sep. 30
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Kansas City, MO	Oct. 1
Knoxville, TN	Oct. 11
Lexington, KY	Oct. 9
Little Rock, AR	Sep. 23
Los Angeles, CA	Nov. 8
Louisville, KY	Oct. 7
Memphis, TN	Sep. 25
Miami, FL	Oct. 4
Milwaukee, WI	Sep. 13
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Oklahoma City, OK	Sep. 18
Omaha, NE	Sep. 25
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Phoenix, AZ	Nov. 1
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Rochester, NY	Nov. 21
Sacramento, CA	Nov. 13
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San Antonio, TX	Oct. 25
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San Francisco, CA	Nov. 15
San Jose, CA	Nov. 18
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Tampa, FL	Oct. 2
Tucson, AZ	Oct. 30
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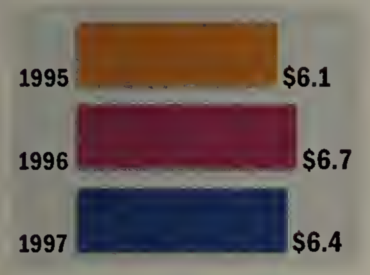
Briefs

■ **Ascend Communications, Inc.** *will bundle NetManage, Inc.'s Chameleon IntraNet software with selected Ascend MAX and Pipeline remote access products to support Windows 3.11, Windows 95, Windows NT and the Macintosh. The software is* **free** *for Ascend customers.*

■ **A rise in PBX sales** *this year is a trend fueled by companies trying to upgrade their equipment to accommodate new area codes, according to San Jose, Calif.-based research firm* **Dataquest, Inc.** *Many older PBXs can't recognize area codes with a number other than 0 or 1 as the middle digit.*

PBX sales

(In millions)



SOURCE: DATAQUEST, SAN JOSE, CALIF.

■ **Midnight Networks** *is now licensing its test suite for* **Multilink Point-to-Point Protocol networks.** *The test suite validates the interoperability of remote access servers, routers, and ISDN connectivity products that use Multilink PPP. It comprises more than 45 tests that have been developed using the RFC 1717 specification. The test suite runs on Midnight's Automated Network Validation Library (ANVL) testing tool, which costs $15,000.*

©Midnight Networks: (617) 890-1001.

■ **LSI Logic Corp.** *last week unveiled an* **ATM chip** *with traffic management capabilities. The ATMizer II is optimized for available bit rate instructions and supports 155M bit/sec full-duplex operation. The chip can be used on network interface cards, switches, servers, bridges, routers and protocol converters. The ATMizer II costs $99 in volume and will ship early next year.*

LSI: (408) 433-8000.

Call centers link to 'Net

Agent screens combine Internet, intranet applications.

By David Rohde

San Jose, Calif.

A leading call center vendor hopes to marry Internet transactions with live call center agents before companies set up alternative channels to handle online product or service orders.

Aspect Telecommunications, Inc. last week introduced Aspect Interactive Web, a system designed to let 'Net surfers perform transactions and simultaneously talk to live agents in a way that duplicates the experience of an 800 call.

The benefit for user companies: Internet transactions receive the same level of customer care and wind up on the same reporting systems as transactions completed via phone calls or interactive voice response (IVR).

Even Internet-savvy consumers frequently reach a point during their Web visits where they wish to reach a human, but are frustrated if the human agent is unaware of what the caller has already input at the Web site, said beta users.

Aspect hopes to solve that problem by giving call center agents the ability to view the caller's passage through the company's Web site while talking to the caller.

Aspect Interactive Web is a server software upgrade to the vendor's Agility IVR system that requires little modification to the user's Web server and none to agent desktops except installation of browser software.

To work, the Agility IVR server and the core Aspect CallCenter automatic call distributor (ACD) must be sitting on the same LAN or WAN as the user's Web server that is accessible by the public. Customer data housed in any ODBC-compliant database must also be accessible both by the Web server and the ACD through a computer telephony link.

Typically, a caller visiting a Web site will click on a "call me now" button, which places an outbound call request in queue on the ACD in a fashion similar to predictive dialers in telemarketing operations.

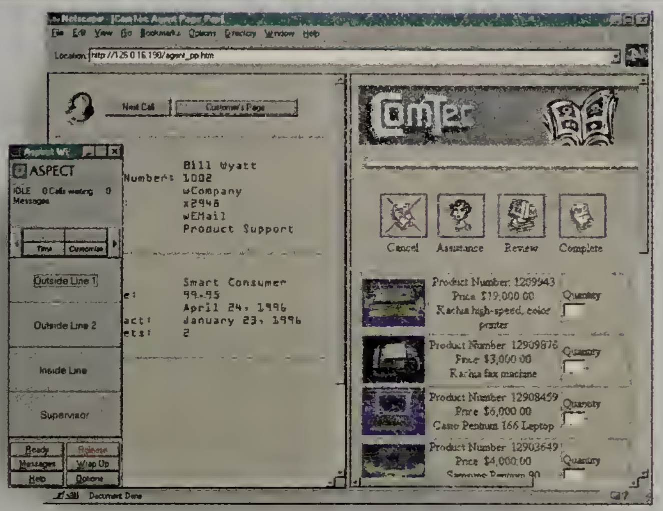
When the ACD places the call, the agent receives two browser screens on his desktop. One is essentially an intranet application with data about the caller, and the other is an Internet application that shows what the caller sees (see graphic).

The customer-data screen also contains a button called Customer's Page. By clicking on this button, the agent can refresh the screen showing what the caller is looking at. Otherwise, the agent's view of the caller's screen remains static, even if the caller has moved on.

Aspect did it this way to prevent the agent's screen from ran-

See **Aspect,** *page 19*

Aspect Interactive Web in action



The Web page on the left provides the call center agent with customer database information, while the one on the right gives the agent a view of what the customer is looking at. The non-Web window at the far left gives the agent internal call center information.

NetSuite, NetSys add audit, SNA features to offerings

By Jim Duffy

Two makers of network design tools have upgraded their wares to track network assets and gauge the performance of SNA/LAN internets.

NetSuite Development this week will roll out NetSuite Professional Audit, software that helps users develop and maintain an accurate documentation of their network.

Last week, NetSys Technologies, Inc. added IBM SNA support to its Connectivity Tools software for planning and troubleshooting Cisco Systems, Inc. router nets.

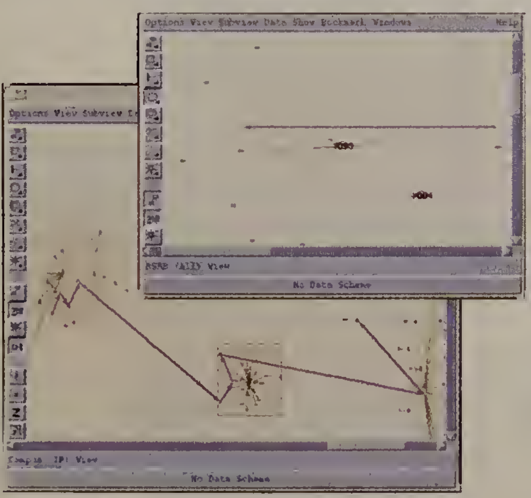
NetSuite Professional Audit runs on Windows workstations along with NetSuite's Professional Design network validation tool, and documents the physical configuration of the network and attached devices during the design process.

Professional Audit gleans topology data from SNMP and IPX management tools, and from Microsoft Corp.'s Systems Management Server and Hewlett-Packard Co.'s OpenView for Windows products.

With this data, users can keep an inventory of device media access control and network addresses, system IDs, segment IDs, media connections, and workstation and server hardware and software configurations.

Professional Audit requires the Professional Design package

See **Tools,** *page 19*



NetSys' *Enterprise/Solver Connectivity Tools 2.0 allows users to map SNA logical topology views to the underlying physical network.*

Boole to manage MQSeries

By Michael Cooney

San Jose, Calif.

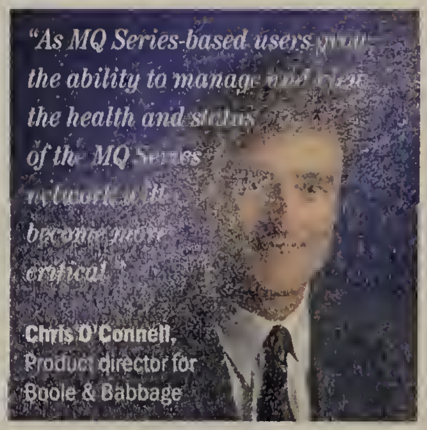
Boole & Babbage, Inc. last week announced a package for managing IBM's MQSeries-based enterprises.

The Command MQ package will let mainframe users more easily track the performance, status and configuration of resources in an MQSeries environment. MQSeries is IBM's asynchronous store-and-forward communications technology that can connect distributed applications across a multivendor environment.

With Command MQ, Boole & Babbage joins Apertus Technologies, Inc.'s MQView and Candle Corp.'s Command Center for MQSeries in the MQSeries management tools market. All three companies currently provide a mainframe-based management package and are promising distributed versions for workstation-based management platforms such as Windows NT or HP-UX later this year.

"The key differentiator for our product will be the variety of

See **Boole,** *page 19*



"As MQ Series-based users gain the ability to manage and view the health and status of the MQ Series network, it will become more critical."

Chris O'Connell,
Product director for Boole & Babbage

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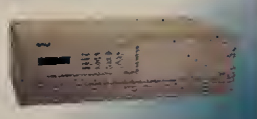
TSU 600



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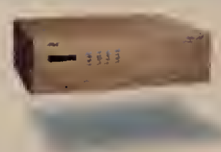

HSU 100

HSU 600

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Circle Reader Service #43

Boole

Continued from page 17

automation routines we can kick off if there's congestion or performance problems in the MQSeries environment,'' said Chris O'Connell, product director for Boole & Babbage.

Command MQ works by gathering data from Command agent software on remote devices.

That information is gathered, stored and displayed on the company's Command/Post enterprise management console.

''The agents report status, configuration and performance data back to the Command console,'' O'Connell said. ''Automation routines inside the agents can be invoked or the operator can take action.''

For example, if an agent detects congestion, it can automatically dump data into another queue or throttle back the device, O'Connell said.

''Users can also direct the agents to clear queues when they know a large batch job or other large file transfer is going to be coming through,'' O'Connell explained.

Later this year, the company will add a Command MQ console package for Windows NT and for the larger SNMP-based managers, such as OpenView and NetView for AIX or Solstice.

Command MQ for the mainframe is available now starting at $30,000.

©Boole & Babbage: (408) 526-3430.

Aspect

Continued from page 17

domly jumping around if the caller gets click-happy, explained Robert Drescher, Aspect's vice president of marketing.

Network World Fusion

Read one consultant's recommendations for integrating call centers and Web sites on Network World Fusion (http://www.nwfusion.com). Select News+.

''That's one way to slow it down and deal with the excited customer who's just punching buttons,'' he said.

Because the Web server is locally available to the agent but the caller is using notoriously slow public Internet links, agents will also have to realize information requested by both parties at the same time will arrive at different speeds, said Aspect officials.

Agility Interactive Web comes with an object-oriented application development tool that buries the HTML code behind a visual programming scheme, plus a licensing option that allows agents to create custom screens for users.

The product will be generally available next week.

©Aspect: (408) 325-2200.

Tools

Continued from page 17

and relies on the real-time notification capabilities of the management system. Professional Audit costs $2,495 and will be available in the fourth quarter.

For users keeping track of SNA and LAN resources, Version 2.0 of NetSys' Connectivity Tools software suite features support for protocols designed to route SNA over IP backbones: source route bridging, and Cisco's Remote Source Route Bridging and Data Link Switching+.

With these new features, users can map the logical SNA topology to the physical infrastructure and simulate the propogation of explorer packets.

Analysts say NetSys is overlooking a big piece of the SNA internetworking pie.

''For most SNA users transitioning from where they are to where they want to be, frame relay is clearly the technology of choice,'' according to John Morency, an analyst at The Registry in Newton, Mass.

''They don't have the support in there right now,'' he said.

Connectivity Tools 2.0 is priced from $10,000 to $65,000.

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Circle Reader Service **#46**

Carrier Services

Covering: Local and Long-Distance Services • Value-Added Networks • Cable, Satellite and Wireless Networks • Regulatory Affairs • Carrier-Based Internet Services

Briefs

■ **Bell Atlantic Corp.** *has started selling* **long-distance** *services outside of its mid-Atlantic region — as allowed by the Telecommunications Act of 1996 — in Michigan, North Carolina and Texas. The Baby Bell said it will likely begin selling long-haul services within its own region sometime next year, once it receives permission from the Federal Communications Commission.*

■ *Giving its users the option to garner the cost efficiencies of frame relay services in the local loop,* **MCI Communications Corp.** *launched its first* **Network-to-Network Interface (NNI)** *offering earlier this month. MCI's HyperStream frame net now links to BellSouth Corp.'s frame relay network via T-1 NNIs, each of which is dedicated to one customer. There are no shared-user NNI options to protect users' bursting capabilities across both nets, according to Melanie Hanssen, a HyperStream senior manager. Hanssen said MCI should have NNIs with the rest of the Baby Bells by the end of the year.*

NNI POPULARITY

There are more than 400 NNIs in use by customers today, half signed on by the LECs and half by the IXCs.

SOURCE: DISTRIBUTED NETWORKING ASSOCIATES

■ **Cable & Wireless, Inc. (CWI)** *has signed a* **cellular resale** *agreement with Bell Atlantic NYNEX Mobile (BANM). CWI plans to enter the cellular market this fall in Philadelphia, Pittsburgh, Baltimore and Washington, D.C. by reselling BANM air time under the CWI label.*

■ **Sprint Corp.** *will offer a 30-day free trial of ClariNet e.News, an Internet* **electronic newspaper,** *to customers of Sprint's dedicated intranet access service. ClariNet e.News, produced by ClariNet Communications, Inc. of San Jose, Calif., features more than 2,000 stories per day from various news sources.*

PacBell gives its users control over 'Net routes

Teams with IBM as another long-distance backbone option.

By Joanie Wexler

San Francisco

Pacific Bell Internet Services (PBIS) recently became the first regional Internet service provider to give users a say in where their traffic goes once it leaves their primary ISP's network.

PBIS has added the IBM Global Network (IGN) as a long-distance choice for its 'Net services. IGN represents a second option to Apex Global Information Services (AGIS), which until now was PBIS's sole ISP partner for globally extending Pacific Bell's regional 'Net reach.

"PacBell is giving users some choice over how their traffic is handled," said Kimberly Lorencic, senior analyst at The Yankee Group, a Boston-based consulting firm. This is the first such setup. Usually, companies choose a provider and are unaware of the route their traffic takes once it leaves that provider's backbone to reach sites on other 'Net segments.

Such a choice for users, as well as peering relationships like those PBIS has struck, will grow as customers' Internet reliability expectations rise, Lorencic said. For example, the PBIS deals with AGIS and IGN are a twist on the existing trend of large ISPs striking direct bilateral peering agreements with each other to increase their level of network management control (see chart). Peers directly connect their routers to yield service that is more reliable than that provided by traditional connections. Typically, those connections are shared among many ISPs on LANs in public network access points.

The LAN scheme is a more economical way to interconnect networks than doing so one by one, considering there are now nearly 3,000 ISPs in the U.S. However, the LANs are running out of capacity and also represent a single point of failure.

The new PBIS 'Net setup parallels today's telephone network scenario, whereby customers specify the long-distance carrier of their choice to their local telephone company. And PBIS, as a Pacific Bell subsidiary (and thus a regulated Bell company), is still allowed to offer services only within its territory. So, as it does in the telephony market, it must hook to other nets for out-of-region IP transport.

But from the customer's viewpoint, it is not clear-cut as to what value downstream ISPs such as PBIS bring to the table, compared, say, with California users simply connecting directly into the AGIS, IGN or other backbone. Mark Fisher, PBIS vice president, said PBIS is sometimes less expensive than a nationwide or global provider.

He also said that "customers who already have a relationship with PacBell but not with IGN [or AGIS] will feel a degree of comfort getting their Internet service from us."

PBIS will not recommend or resell its partners' services. If a customer asks for help differentiating between the two providers, PBIS will provide basic information and literature, Fisher said. ■

Peering partners

PacBell has linked its regional backbone with networks from AGIS and IBM to provide long-distance Internet services. The setup enhances net reliability and eases management, as do direct bilateral ISP peering agreements such as those shown below.

ISP	Direct-connect peers
AGIS	ANS, BBN, IGN, MCI, Netcom, PSINet, Sprint, UUNET
ANS	AGIS, BBN, MCI, Sprint
BBN Planet	AGIS, ANS, MCI, UUNET
MCI	AGIS, ANS, BBN, Sprint, UUNET
Sprint	AGIS, ANS, MCI, UUNET
UUNET	AGIS, BBN, MCI, Sprint

FCC gives competitive access providers an edge

By Tim Greene and David Rohde

Washington, D.C.

Traditional competitive access providers (CAP) that have their own switches are pleased, if not gleeful, about one aspect of the new federal rules governing local telephone competition: They get a 10-month window to buy local access cheaper than rival AT&T.

The situation will not affect prices charged by the CAPs because they already have their own switches, and so never had to pay for access to local exchange carrier (LEC) switching. But it does give them an edge over AT&T and other carriers that want to crack the local market but lack local switching. Those carriers have to buy local service for resale, plus pay a separate, additional charge for access to local switching.

The recent Federal Communications Commission ruling means that LECs can charge AT&T about 3 to 4 cents per minute for traffic traversing LEC network-access switches. CAPs such as MFS Communications Corp., MCI Metro or Teleport Communications Group (TCG), which already have local switches, can avoid paying that access fee.

"This will make improved near-term opportunities for companies that have taken the time to deploy their own switches, and that should position TCG well to compete with anyone," said Manning Lee, TCG's vice president of regulatory affairs.

It will also give TCG the chance to sell its switching to other carriers such as AT&T at a price to beat the LECs, according to Robert Atkinson, TCG's senior vice president of regulatory and external affairs.

The access fees prop up the universal access fund, which subsidizes LECs to provide phone service to areas with a low rate of return on investment in network hardware — typically rural areas.

The question of how universal access should be funded in the future is up in the air and is the subject of separate FCC action scheduled to be decided next May. The FCC said leaving the access-switch charges in place will preserve "the status quo with respect to subsidy payments."

That opinion upset AT&T because it wants to piece together a local network of its own by buying switched local service from LECs and reselling it. If it also has to pay the interexchange carrier access charge, it feels it will be billed for access to its own network. AT&T was not placated by the FCC knocking 25% off that fee for customers to whom AT&T resells local service.

AT&T is continuing to fight on related matters. The day after the FCC decision, AT&T asked the Maryland Public Service Commission to reject a proposed cap by Bell Atlantic Corp. on how many resale customers AT&T could sign up during its first eight months in the local market.

Meanwhile, BellSouth Corp. is challenging an FCC order that regional Bell operating companies allow users to keep their phone number if they switch to another LEC. Such number portability currently is provided on an interim basis using a form of call-forwarding.

In a court appeal, BellSouth attacked a provision, saying that until true portability is provided, RBOCs must provide interim number portability for free.

BellSouth complained it should be paid at least $1 a month per line for the service, citing a previous agreement approved by Florida regulators. ■

At least they don't starve

TELECOM IN TRANSITION

FCC officials made repeated references to late hours, lost sleep and take-out food, all because of the work involved in devising the local interconnection rules:

Number of pages of comment letters: 17,000

Number of pages in the order: 700

"We've logged a lot of time and a lot of pizza."
— FCC Commissioner Rachelle Chong

WAN MONITOR

Internet/PSTN: The shape of things to come

We've pushed the concept of using packet-based voice and video for many non-mission-critical (and even some mission-critical) applications. The idea is that since the network already exists, you might as well put it to good use. While the quality in some instances may be suspect, it can be sufficient to do the task.

Some new offerings are making it easier than ever before for customers to jump into this fray and reduce their international communications costs.

At least two firms, IDT (www.idt.net), with its Net2Phone service (www.net2phone.com), and The Global Exchange Carrier Company, Inc. (www.gxc.com) — also known as The Internet Long Distance Company — have made a play for using the 'Net to carry the long-haul portion of a telephone call, with the public switched telephone network (PSTN) hop-off as the final leg.

Basically, you load Internet telephony software onto your PC, and connect with Internet telephony voice gateways that bridge the Internet with the PSTN.

GXC, for instance, distributes its PC-based Internet Protocol phone (known as the Gx-Phone) via its Web site (www.gxc.com).

The current version of the Gx-Phone operates in tandem with Vocaltec's Internet Phone.

We tested GXC's new system, which just came out late last month. We placed a number of calls from a PC in San Diego, connected to the Internet via a 28.8K bit/sec modem to regular phones in our offices in New Jersey, Oklahoma and Virginia. All our calls were connected quickly, and on the first try.

How was the quality? Not up to PSTN standards — latency was on the order of 0.4 to 0.5 seconds, there was a noticeable element of static, and a general degradation of voice quality. These traits are characteristic of all voice communications over the Internet. As we've discussed before, enhancements in access bandwidth (like ADSL) and some sort of packet prioritization on the backbone of the Internet could go a long way toward alleviating these shortcomings.

Daniel Briere and Christine Heckart

Would your CEO use it to close a business deal? No, probably not. Would your mail room use it to sync up routine shipments? Maybe. Is it ready for prime time? Hey, these are the first-generation products — give them some time.

Nonetheless, these new providers are offering some interesting capabilities that start exploiting computer/telephony/Internet integration:

- **On-demand calling records.** In fact, five seconds after callers hang up, they can obtain a calling record of the call just placed, including number called, date, time, rate, cost, duration and the IP address from which the call was placed.
- **Directory assistance.** GXC has loaded just about every number it can find from various and sundry databases into a massive online directory assistance repository.
- **Real-time tone keypad.** In addition, more packet-based options are coming on the market. We'll look at some options for fax and multipoint conferencing soon.

Briere is president and Heckart is director of broadband with TeleChoice, Inc., a consultancy in Verona, N.J. They can be reached at dbriere@telechoice.com and checkart@telechoice.com.

NetworkWorld
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v'96.1!
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6. Understand the positioning of the major players in the intranet market
7. Learn how Web servers work and how they can be extended
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10. Learn the direction of intranet-based groupware

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In the security section you will explore the implications of intranet thinking with regard to defending your most valuable corporate asset: Information. Security will be examined from the perspective of firewall strategies and implementations, server security and information publishing security. The connectivity section will focus on the challenge of achieving maximum utility via the integration of legacy systems and existing corporate databases. We'll also discuss and examine the implications of internet mail standards on your intranet design. Concluding with management, the core tools of intranet development and management will be closely examined. We'll focus on the directions and the trends that will affect your intranet solutions.

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6. Seeing how legacy systems can be integrated with the intranet environment
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DATES & LOCATIONS

DAY 1 DATE	CITY	DAY 2 DATE
10/21/96	Boston, MA	10/22/96
10/24/96	New York, NY	10/25/96
11/6/96	Chicago, IL	11/7/96
12/2/96	Washington, DC	12/3/96
12/5/96	Atlanta, GA	12/6/96
12/10/96	San Francisco, CA	12/11/96
1/21/97	Morristown, NJ	1/22/97
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THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING

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1 Industry: (check one only)

01. ☐ Manufacturers (other)
02. ☐ Finance/Banking
03. ☐ Insurance/Real Estate/Legal
04. ☐ Health Care Services
05. ☐ Hospitality/Entertainment/Recreation
06. ☐ Media/TV/Cable/Radio/Print
07. ☐ Retail/Wholesale Trade/Business Services
08. ☐ Transportation
09. ☐ Utilities
10. ☐ Education
11. ☐ Process Industries (Mining/Construction/Petroleum Refining/Agriculture/Forestry)
12. ☐ Government (Federal/State/Local)
13. ☐ Military
14. ☐ Aerospace
15. ☐ Consultants (Independent)
16. ☐ Carriers/Interconnects
17. ☐ Manufacturers (Computer/Communications)
18. ☐ Resellers of Computer/Network Products (VARs, VADs)
19. ☐ Systems/Network Integrators
20. ☐ Distributors (Computer/Communications)
21. ☐ Other *(please specify)*______________

2 What is your job function? (check one only)

NETWORK IS MANAGEMENT:

1. ☐ Networking Management
2. ☐ LAN Management
3. ☐ Datacom/Telecom Management
4. ☐ IS, IT, MIS, Systems Management
5. ☐ Engineering Management
6. ☐ Corporate Management (CIO, CEO, Pres., VP, Dir., Mgr., Financial Management)
7. ☐ Consultant (Independent)
8. ☐ Other *(please specify)*______________

3 What is the total number of sites for which you have purchase influence? (check one only)

1. ☐ 100+
2. ☐ 50 - 99
3. ☐ 20 - 49
4. ☐ 10 - 19
5. ☐ 2 - 9
6. ☐ 1
7. ☐ None

4 What is your scope and involvement in purchasing decisions for network products & services for your enterprise?

A. SCOPE (check one only)
1. ☐ Corporate/Enterprise
2. ☐ Department
3. ☐ None

B. INVOLVEMENT (check all that apply)
1. ☐ Recommend/Specify
2. ☐ Approve
3. ☐ Evaluate
4. ☐ Determine the need
5. ☐ None

5 Check ALL that apply in Columns A and B:

A. I am involved in the purchase of the following products/services:
B. I plan to purchase the following products/services:

A B
☐ 100 ☐ **LOCAL-AREA NETWORKS**
☐ 01. ☐ Local-Area Networks
☐ 02. ☐ Network Op. Sys. Software
☐ 03. ☐ LAN Storage/Backup
☐ 04. ☐ Optical LAN Storage/Backup
☐ 05. ☐ Disk LAN Storage/Backup
☐ 06. ☐ Tape LAN Storage/Backup
☐ 07. ☐ RAID LAN Storage/Backup
☐ 08. ☐ Network Test/Diagnostic Tools
☐ 09. ☐ Cables, Connectors, Baluns
☐ 10. ☐ UPS
☐ 11. ☐ Network Interface Cards
☐ 12. ☐ Peer-to-Peer LANs
☐ 13. ☐ SNMP Network Management
☐ 14. ☐ ATM Switches
☐ 15. ☐ Token-Ring Switches
☐ 16. ☐ Ethernet Switches
☐ 17. ☐ Remote LAN Access/Communications Servers
☐ 18. ☐ Superservers
☐ 19. ☐ File/Application Servers
☐ 20. ☐ Print Servers/Fax Servers
☐ 21. ☐ CD-ROM Servers
☐ 22. ☐ LAN Servers

A B
☐ 101 ☐ **INTERNETWORKING**
☐ 23. ☐ Bridges
☐ 24. ☐ Routers
☐ 25. ☐ Bridge/Router
☐ 26. ☐ Gateways
☐ 27. ☐ Intelligent Hubs
☐ 28. ☐ Stackable Hubs

A B
☐ 102 ☐ **COMPUTERS/PERIPHERALS**
☐ 29. ☐ Laptops/Notebooks/Sub-Notebooks
☐ 30. ☐ Micros/PCs
☐ 31. ☐ Minis
☐ 32. ☐ Mainframes
☐ 33. ☐ Workstations
☐ 34. ☐ Terminals
☐ 35. ☐ Printers/Network Printers
☐ 36. ☐ Cluster Controllers
☐ 37. ☐ CD-ROM
☐ 38. ☐ Fax/Modem Boards

A B
☐ 103 ☐ **REMOTE/WIRELESS COMPUTING**
☐ 39. ☐ PDAs
☐ 40. ☐ PCMCIA Devices
☐ 41. ☐ Wireless Data Services
☐ 42. ☐ Wireless Data Equipment
☐ 43. ☐ Wireless LANs
☐ 44. ☐ Cellular Equipment & Services

A B
☐ 104 ☐ **INTERNET/INTRANET**
☐ 45. ☐ Internet Access Service
☐ 46. ☐ Firewalls/Security
☐ 47. ☐ Web Servers
☐ 48. ☐ Web Browsers
☐ 49. ☐ Intranet Applications/Groupware
☐ 50. ☐ Search Retrieval Products (web crawler)
☐ 51. ☐ Internet Development Tools
☐ 52. ☐ Internet Commerce Tools

A B
☐ 105 ☐ **SOFTWARE/APPLICATIONS**
☐ 53. ☐ Network Management
☐ 54. ☐ Systems Management
☐ 55. ☐ Security
☐ 56. ☐ Communications Software
☐ 57. ☐ Terminal Emulation
☐ 58. ☐ Word Processing
☐ 59. ☐ Operating Systems
☐ 60. ☐ Client/Server Applications Development
☐ 61. ☐ Database Management/RDBMS
☐ 62. ☐ Spreadsheet
☐ 63. ☐ Groupware
☐ 64. ☐ EDI
☐ 65. ☐ E-mail
☐ 66. ☐ Windows/Graphical User Interface
☐ 67. ☐ Multimedia
☐ 68. ☐ Graphics/DTP
☐ 69. ☐ Remote Access
☐ 70. ☐ Imaging
☐ 71. ☐ Server Suites (Backoffice, etc.)
☐ 72. ☐ Suites
☐ 73. ☐ Middleware
☐ 74. ☐ Document Management
☐ 75. ☐ Database Server
☐ 76. ☐ Site Metering Tools
☐ 77. ☐ Computer-Integrated Telephony (CIT)

A B
☐ 106 ☐ **WIDE-AREA NETWORK EQUIPMENT & SERVICES**
☐ 78. ☐ Frame Relay Equip./Services
☐ 79. ☐ Modems
☐ 80. ☐ FT-1/T-1/T-3 Multiplexers
☐ 81. ☐ FT-1/T-1/T-3 Services
☐ 82. ☐ SONET
☐ 83. ☐ Inverse Multiplexers
☐ 84. ☐ SMDS
☐ 85. ☐ Asynchronous Transfer Mode
☐ 86. ☐ Diagnostic/Test Equipment
☐ 87. ☐ DSU/CSU
☐ 88. ☐ VSAT/Satellite
☐ 89. ☐ ISDN Equipment & Services
☐ 90. ☐ PBXs
☐ 91. ☐ Voice Mail/Response
☐ 92. ☐ Videoconferencing
☐ 93. ☐ Leased Lines
☐ 94. ☐ Switched Data
☐ 95. ☐ E-mail
☐ 96. ☐ 800/900/MTS Services
☐ 97. ☐ Virtual Networks
☐ 98. ☐ Outsourcing/Systems Integration Services
☐ 99. ☐ Education/Training Services

☐ 107 ☐ None of the above (1-99)

B10896

6 What is the total number of LANs, workstations/nodes at this location/in your organization?

At this location:

	LANs		Workstations/ Nodes
1.	☐	5,000+	☐
2.	☐	1,000 - 4,999	☐
3.	☐	100 - 999	☐
4.	☐	50 - 99	☐
5.	☐	10 - 49	☐
6.	☐	1 - 9	☐

Entire organization:

	LANs		Workstations/ Nodes
1.	☐	5,000+	☐
2.	☐	1,000 - 4,999	☐
3.	☐	100 - 999	☐
4.	☐	50 - 99	☐
5.	☐	10 - 49	☐
6.	☐	1 - 9	☐

7 Check ALL that apply in Columns A and B:

A. The following network platforms are currently installed:
B. The following network platforms are planned for purchase:

A B
☐ 55 ☐ **NETWORK PROTOCOLS**
☐ 01. ☐ SNA
☐ 02. ☐ DECnet
☐ 03. ☐ TCP/IP
☐ 04. ☐ Novell IPX/SPX
☐ 05. ☐ APPC/APPN/LU 6.2
☐ 06. ☐ NETBIOS
☐ 07. ☐ AppleTalk
☐ 08. ☐ NFS
☐ 09. ☐ IPv6
☐ 10. ☐ SNMP/SNMPv2
☐ 11. ☐ Other *(please specify)*______________

A B
☐ 56 ☐ **NETWORK OPERATING SYSTEM**
☐ 12. ☐ Microsoft (LAN Manager)
☐ 13. ☐ Novell (NetWare 2.X, 3.X)
☐ 14. ☐ Novell (NetWare 4.X)
☐ 15. ☐ Windows NT
☐ 16. ☐ Windows NT/Advanced Server
☐ 17. ☐ LocalTalk (AppleTalk)
☐ 18. ☐ Banyan (VINES)
☐ 19. ☐ IBM (LAN Server)
☐ 20. ☐ IBM (PC LAN Program)
☐ 21. ☐ Artisoft (LANtastic)
☐ 22. ☐ Digital (Pathworks)
☐ 23. ☐ Other *(please specify)*______________

A B
☐ 57 ☐ **LAN ENVIRONMENT**
☐ 24. ☐ 4M Token Ring
☐ 25. ☐ 16M Token Ring
☐ 26. ☐ Ethernet
☐ 27. ☐ Fast Ethernet
☐ 28. ☐ 100vg Any LAN
☐ 29. ☐ FDDI
☐ 30. ☐ LocalTalk
☐ 31. ☐ 10Base-T
☐ 32. ☐ ATM
☐ 33. ☐ Other *(please specify)*______________

A B
☐ 58 ☐ **COMPUTER OPERATING SYSTEM**
☐ 34. ☐ DOS
☐ 35. ☐ Unix/Xenix/AIX
☐ 36. ☐ OS/2
☐ 37. ☐ OS/2 Warp
☐ 38. ☐ IBM MVS
☐ 39. ☐ IBM VM
☐ 40. ☐ Digital VMS
☐ 41. ☐ Macintosh
☐ 42. ☐ Windows
☐ 43. ☐ Windows 95
☐ 44. ☐ NT
☐ 45. ☐ Solaris
☐ 46. ☐ Other *(please specify)*______________

☐ 47. ☐ None of the above (1-46)

8 For which areas outside of North America do you have purchase influence? (check all that apply)

1. ☐ Europe
2. ☐ Asia
3. ☐ South America
4. ☐ Australia
5. ☐ Middle East
6. ☐ None

9 Please indicate your involvement in developing/implementing Internet/Intranet Technologies: (check all that apply)

1. ☐ Recommend/Specify
2. ☐ Approve
3. ☐ Evaluate
4. ☐ Determine the need
5. ☐ Implement
6. ☐ None

10 Which of the following hardware platforms are installed/planned in your company? (check all that apply)

Mainframes	A – Installed	B – Planned
1. IBM	☐	☐
2. Amdahl	☐	☐
3. Cray	☐	☐
4. Hitachi	☐	☐
5. Unisys	☐	☐

Minis	C – Installed	D – Planned
1. IBM	☐	☐
2. Digital	☐	☐
3. Tandem	☐	☐
4. Unisys	☐	☐
5. AT&T GIS	☐	☐
6. HP	☐	☐
7. Data General	☐	☐

What is the total number of Servers/Clients installed/planned: (USE NUMBERS ONLY)

E-AT THIS LOCATION	#	F-% with Internet Access
1. Servers		%
2. Clients		%

G-ENTIRE ORGANIZATION	#	H-% with Internet Access
1. Servers		%
2. Clients		%

Which of the following Servers/Clients do you have installed/planned: (CHECK ALL THAT APPLY)

	At this location:		Entire organization:	
	I. Servers	J. Clients	K. Servers	L. Clients
01. Power PC	☐	☐	☐	☐
02. Power Mac	☐	☐	☐	☐
03. Mac Other	☐	☐	☐	☐
04. Multi Processor Servers	☐	☐	☐	☐
05. P6	☐	☐	☐	☐
06. Pentium Pro	☐	☐	☐	☐
07. Pentium	☐	☐	☐	☐
08. 486	☐	☐	☐	☐
09. 386	☐	☐	☐	☐
10. 286	☐	☐	☐	☐
11. Risc	☐	☐	☐	☐
12. Other	☐	☐	☐	☐

11 What is the estimated value of networking equipment and services that you help specify, recommend or approve annually? (check one only)

01. ☐ $100 million or more
02. ☐ $50 million - $99.9 million
03. ☐ $25 million - $49.9 million
04. ☐ $20 million - $24.9 million
05. ☐ $10 million - $19.9 million
06. ☐ $5 million - $9.9 million
07. ☐ $1 million - $4.9 million
08. ☐ $500,000 - $999,999
09. ☐ $250,000 - $499,999
10. ☐ $249,999 or less
11. ☐ None of the above

12 Estimated gross annual revenue of your entire company/institution: (check one only)

1. ☐ $10 billion or more
2. ☐ $1 billion to $9.9 billion
3. ☐ $500 million to $999.9 million
4. ☐ $100 million to $499.9 million
5. ☐ $50 million to $99.9 million
6. ☐ $10 million to $49.9 million
7. ☐ $5 million to $9.9 million
8. ☐ $4.9 million or less
9. ☐ None of the above

13 Estimated number of employees at this location/in entire organization:

At this location:
1. ☐ Over 10,000
2. ☐ 5,000 - 9,999
3. ☐ 2,500 - 4,999
4. ☐ 1,000 - 2,499
5. ☐ 500 - 999
6. ☐ 499 or less

Entire organization:
1. ☐ Over 10,000
2. ☐ 5,000 - 9,999
3. ☐ 2,500 - 4,999
4. ☐ 1,000 - 2,499
5. ☐ 500 - 999
6. ☐ 499 or less

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Briefs

Novell, Inc. *is suggesting NetWare 4.X users first download its Novell Directory Services (NDS) update before upgrading to the impending* **Green River** *release. The update, free from Novell's Web site (www.netware.novell. com), comprises two NetWare Loadable Modules that improve message transmission accuracy on older hardware, cut down on NDS tree repair time, and identify and contain corrupted tree segments.*

Novell: (800) 453-1267.

NetPro Computing, Inc. *of Scottsdale, Ariz., announced a new version of its* **Novell Directory Services (NDS)** *utility that simplifies management of the directory from an SNMP-based administration console. DS Expert 2.0 also includes tighter integration with Novell, Inc.'s ManageWise, an expanded help system and new installation tools. A free two-server DS Expert 2.0 starter pack can be downloaded from NetPro's Web site (www.netpro.com/freeoffer). Additional agents cost $499 per server.*

NetPro: (800) 998-5090.

Cabletron Systems, Inc. *last week made its foray into the small office/home office market with the announcement of its first* **ISDN remote access router.** *The CyberSwitch 100*

will provide users with remote connectivity to central LAN and WAN resources and the Internet. The device, which supports IP and IPX routing as well as bridging, offers up to 512K bit/sec of throughput using built-in data compression. In addition, CyberSwitch 100 comes with the QuickSet graphical user interface for Windows 95 and Windows NT for easy installation.

Pricing for the CyberSwitch starts at $640.

Cabletron: (603) 332-9400.

Microsoft runs with Wolfpack to address server clustering needs

The upcoming Wolfpack clustering extensions to Microsoft Corp.'s Windows NT 4.0 release are just one more sign that Microsoft is beaming in on the needs of enterprise network customers. *Network World* Staff Writer Ben Heskett recently spoke with Mark Wood, a Wolfpack product manager at Microsoft, about the technology's role in customers' networks.

Microsoft's *Wood*

What role will Wolfpack play in Windows NT-based and heterogenous networks?

Wolfpack will only let you harden the NT nodes in your network for higher availability and scalability.

It is not applicable to other operating systems, but a Wolfpack cluster will benefit from NT's ability to work with the network infrastructure. So a Wolfpack cluster will have the same interoperability with NetWare that NT by itself has with NetWare.

Do you have a vision of how customers will use Wolfpack?

There are three scenarios we expect to be pretty common. One is where a customer already has a couple of servers sitting fairly close to each other, so with Wolfpack they can easily be clustered together and gain the benefits of availability. One can back up the other.

Another scenario is where customers will cluster machines together, so when it comes time to take a server offline to apply a service pack or a new version of an application, they can simply move the workload over to the other machine. This way, maintenance won't require taking down the network.

The third scenario is where you've got a server that is fully loaded and the workload is growing, or you have perhaps an older server that is fully depreciated and it's time to upgrade it. As a nondisruptive upgrade, you will acquire the new server, place

See **Wolfpack,** ***page 26***

A sampling of NDS applications

Novell has issued a list of 210 applications that support NDS in NetWare 4.X environments. Here are a handful of them:

Product category	Product name	Vendor
Directory management	DS Expert	NetPro
	DS Standard and AuditWare for NDS	Preferrred Systems
	DS Assist	Snap-In Softools
Backup and restore	ARCserve	Cheyenne Software
	NetWorker	Legato Systems
	Storage Manager Management Group	Seagate Software Storage
Development tools	NetWare Developer Suites	Apiary
	Bindview NDS	Bindview
	Powerbuilder	Powersoft
Groupware	Beyond Mail	Banyan
	Notes 4.0	Lotus
	GroupWise	Novell
	DaVinci Mail	ON Technology
Databases	Oracle7 Enterprise Server	Oracle

The selling of NDS as a cross-platform product

Novell has its work cut out for it bringing ISVs on board.

By Christine Burns

Novell, Inc. has set out on a course to make its previously NetWare-centric Novell Directory Service (NDS) run across other operating systems, namely Windows NT and Unix.

Company officials tell of endless opportunities for applications using a network operating system (NOS)-independent version of NDS, which gives end users a single logon to all network services and provides a central point of administration for enterprise resources.

But in order for NDS to proliferate beyond NetWare, Novell needs the support of independent software vendors. They have already written hundreds of NDS applications for NetWare environments, but the question is: Will they do the same for other platforms?

Neil MacDonald, an analyst with Gartner Group, Inc. in Stamford, Conn., isn't so sure. "Any decent NOS today has a variety of infrastructure tools," he said, referring to the fact that most NDS applications today fall into the category of NetWare administration tools. "But what's needed is support for the shrink-wrapped business applications that are at the core of any business. And that's exactly where NDS doesn't have the support.

Thomas Arthur, general manager of Novell's Internet infrastructure division, envisions NDS being used for sales auto-

See **NDS,** ***page 26***

UB makes Fast Ethernet plunge

By Jodi Cohen
Santa Clara, Calif.

UB Networks, Inc. last week rolled out a series of LAN modules — including its first Ethernet/Fast Ethernet switch — for the company's top-of-the-line switching hub.

All ports on the 16-port Ethernet/Fast Ethernet switch module can autonegotiate between 10M and 100M bit/sec, allowing customers to migrate to high-speed links at their own pace. An 11-slot GeoLAN/500 chassis can be fully loaded to support as many as 176 100M bit/sec ports.

The switch module runs at wire speed and supports four groups of the Remote Monitoring standard. In addition, the device supports software-based IP routing and can configure up to 65,000 virtual LANs via port assignment or media access control address.

Competitors such as 3Com Corp., Bay Networks, Inc., Cabletron Systems, Inc., Cisco Systems, Inc. and Xylan Corp. are already shipping Fast Ethernet switches, so UB is a bit late to the party. But UB makes up for its late market entry by pricing its device at $600 per port — about half that of existing chassis-based 100M bit/sec switch modules, one analyst said.

"UB is jumping in — albeit late — with a price point that one-ups the marketplace," said Eric Hinden, program manager at The Yankee Group, a consultancy in Boston. "UB is actually aggressive enough that they might avoid the price-of-the-month club where every month a vendor comes out with better pricing. UB might stay as a price leader for a while."

In addition to the Fast Ethernet switch, UB rolled out a 24-port Ethernet switch module that allows GeoLAN/500 customers to cram the box with as many as 264 Ethernet ports. UB also unveiled a 12-port 100M bit/sec Ethernet concentrator card and two-port ATM and FDDI high-speed uplink modules.

©UB: (408) 496-0111.

GeoLAN/500 switching hub modules

Module	Price per port	Availability
16-port autosensing 10/100M bit/sec Fast Ethernet switch	$600	December
24-port Ethernet switch	$250	December
12-port Fast Ethernet concentrator	$350	October
2-port 155M bit/sec ATM and FDDI uplink	$4,000	Q1 1997

IRED WINDOWS

Windows NT 4.0 is a mixed bag

In the next week or so, Windows NT 4.0 should start appearing on the shelves of your favorite retailer.

You'll remember that in the spring, there was much speculation about the shipping date being pushed off until late fall to accommodate directory services technology that Microsoft Corp. was thinking of moving up from the Cairo version of NT to Version 4.0. In the end, Microsoft shipped Exchange Server's directory services with NT 4.0 and simply claimed this was the enterprise directory you needed, offering a single logon service for all of your servers and applications.

Dave Kearns

Astute administrators will notice that this is true only if all your servers and applications were developed by Microsoft. Don't look to seamlessly integrate NetWare and Unix servers and hosts.

Microsoft will also try to convince customers to make the NT Server plunge because of the Internet support it includes. Microsoft has bundled its Internet Explorer Web browser into the desktop and server editions of NT 4.0. The server also includes Internet Information Server, an HTTP server and FrontPage, Microsoft's HTML authoring tool.

What I'd suggest when it comes to picking a Web server, though, is focusing on the Web server itself, making sure it does what you need it to do and that you'll be comfortable administering it. Go with that product and run it on the platform or platforms for which it is intended. Don't buy a network operating system (NOS) just because it includes a Web server.

If NOSes were rated like restaurants, then NT Server 4.0 could very well rate four stars: The presentation is dazzling. But network administrators are, deep down, meat-and-potatoes people looking at the steak and trying to ignore the sizzle. NT Server is now dead last among major NOS products in directory services, trailing products from Novell, Inc., Banyan Systems, Inc. and IBM. As it looks now, all three competitors will have better directory services products — before Cairo arrives — for incorporating NT clients and servers.

While NT 4.0 Server has some holes, the desktop update to NT looks strong.

Its Windows 95-style user interface is a vast improvement over the one in NT 3.51. NT 4.0 also features improved stability, which, when combined with the new interface, makes NT Workstation the prime candidate for your business desktop operating system.

These features should help you cut down on support and training costs. Since the cost of support is traditionally much higher than the cost of acquiring new software, switching to NT Workstation desktops from Windows 95 can be cost-effective, though it means initially higher hardware costs.

The only thing that might hold you back in planning to roll out NT Workstation would be support for legacy Windows 3.X and DOS applications. It's important that you have a plan for bringing these up to date before or during your rollout.

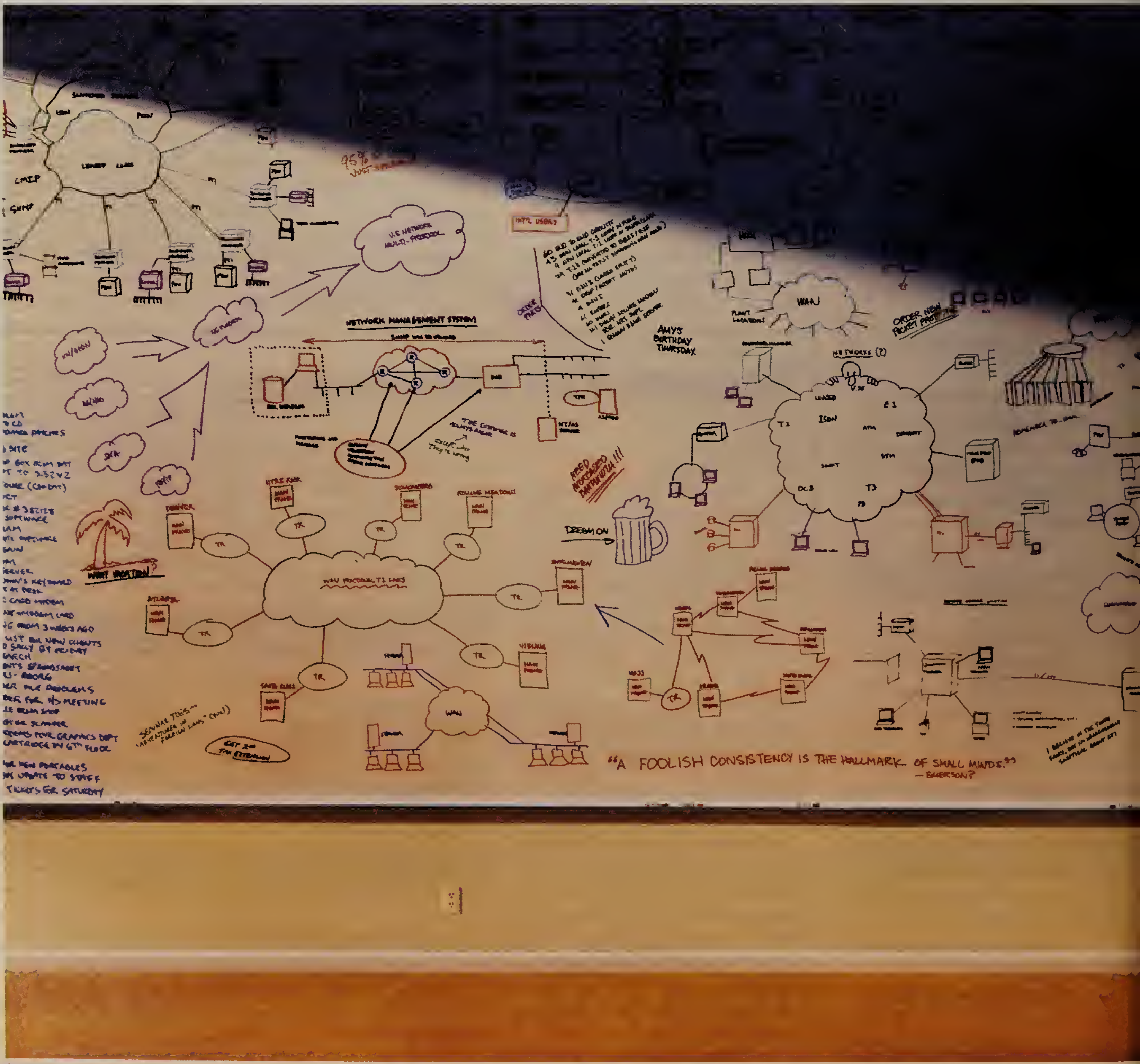
Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. He can be reached at dkearns@msn.com.

Tip of the week

SoftwareAge (http://www.softwareage.com) has introduced a database of over 2,000 applications that is searchable by vendor, product name and product category. Enter the product category you're interested in and get back a listing of all the applications that meet your description.

SIEMENS
ROLM Communications

Handling the complexities of your telecommunications system is a lo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DREAM ON
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— EMERSON?

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NET RESULTS

Technical support on the Web isn't always easy to find

You can do virtually anything you want over the Internet.

You can send E-mail to your grandmother, find someone to walk your dog, and even have dinner delivered piping hot and ready to eat.

But has anyone ever tried to use a vendor's Web page to get a software bug fixed?

You get to the vendor's Web page, wade through all the advertising and marketing, and then you find the technical support or customer service button way off in the corner. You are then asked to fill out a form with your name and all the technical specifications about your software package and hardware environment.

Next comes a little box where you have to detail the specific problem that you are having. Usually this box is 3 inches wide, which makes you either scroll endlessly or embed many carriage return/line feeds into the text as you type about four words per line. You then send the E-mail and wait for a response.

And you wait. And wait. And wait.

The shortest response time we have ever had was four days, and that was on a top-priority, killed-my-system type of problem. When we think about router support over the Internet — or ATM switch support for that matter — we bust up laughing.

There are too many what-ifs:

- What if you are having problems with the router that attaches your company to the Internet?
- What if the backbone is out and you can't get to any other resources?
- What if the tech support server is oversubscribed and you can't download your patch?
- What if your network connection goes down?
- What if your service provider has a power outage?
- What if no one gets back to you?

Should you just use the telephone? The answer to that question, many times, is yes.

Software patches, information on basic problems, frequently asked questions and new software releases can all be easily found on the Internet. But we believe that real support requires a technically qualified human using a reliable medium — such as the telephone.

Skip MacAskill and Melinda Le Baron

If our network is down or we have a substantial problem with communications, we want to make sure that someone at the vendor site is taking personal responsibility for getting it fixed.

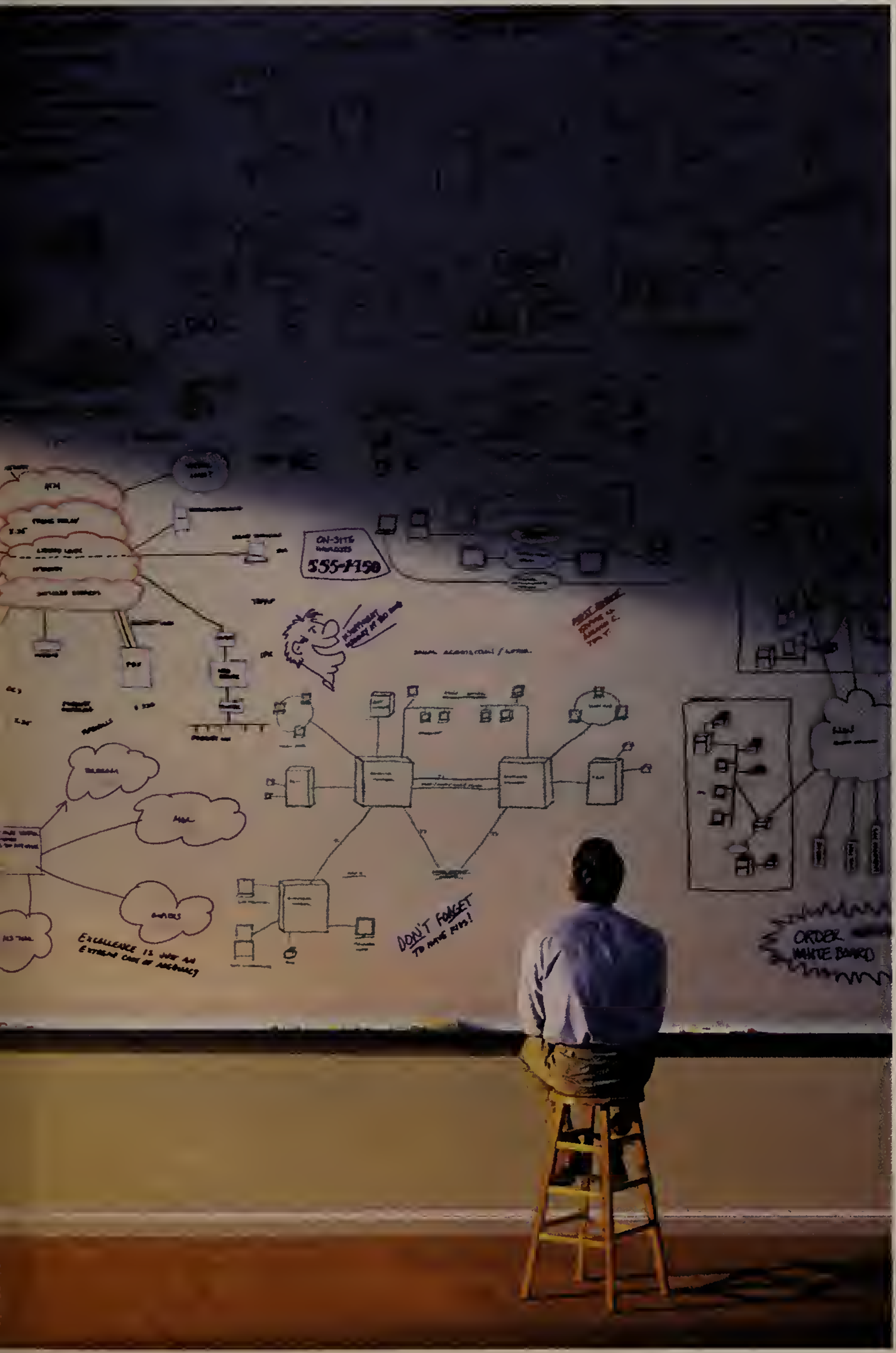
We want a name and title, and a target date and time when the problem will be solved. We also want an escalation procedure in case the problem requires software or hardware engineers.

We want to be able to hold someone responsible when we do not get results. With a generic, sterile and nonpersonal Web page, we get none of the assurance or satisfaction that we get from a live technical support engineer.

Videoconferencing, Internet phone calls and other multimedia advances can provide a more human interface; all it takes is wide-area bandwidth, but that's something most network managers can't spare. We believe that vendors will continue to provide support over the Internet. And if users can still get to it when they have a problem, it may be an option — but only if the phones are down.

MacAskill is a senior research analyst and LeBaron is a research director in Gartner Group, Inc.'s Network Computing Infrastructure group. They can be reached at (203) 316-1111 or at inquiry@gartner.com.

ly job. Mind if we join you?



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*Circle Reader Service #***54**

NDS

Continued from page 23

mation applications that authenticate salespeople and customers to a corporate network; secured Internet services such as AT&T's existing WorldNet Intranet Connect Service; and electronic commerce.

ONLINE
See more info on Network World Fusion, including:
- Reviews of five NDS management apps
- Articles on how Novell and other directory vendors are moving toward LDAP
- A look at NDS/GroupWise integration

Select News+.
Network World Fusion
http://www.nwfusion.com

Novell's attempt to spur development of such applications comes down to making it easier to build NDS-aware applications, said Dave Clare, director of product management for Novell's developer service division. That is what Novell's Net2000 initiative is all about, he said.

Announced in September, Net2000 consists of a set of APIs designed to let developers build NDS applications using OLE/ActiveX, Visual Basic, Delphi and Java-based tools. In March, Novell released a set of controls that let developers easily access NDS through popular desktop authoring tools.

Some developers feel Novell is moving in the right direction with Net2000.

Alex Whitney, a senior engineering manager at Powersoft Corp., said his company has included the OLE/ActiveX controls in PowerBuilder 5.0.

"These [controls] let you query NDS services like a database, and extend the information there to include information about your application," said Whitney, who figures his company's support for Net2000 will result in more NDS applications being written for non-NetWare platforms.

However, some observers question the wisdom of throwing all of one's weight behind a proprietary directory API set.

Hilly Fuchs, assistant vice president of information systems at Continental Grain Co. in New York, said while his firm has standardized on Banyan Systems, Inc.'s VINES and StreetTalk directory service, he is looking to move away from reliance on a proprietary directory system.

"Novell can't do any worse than Banyan in terms of getting developers to write to their directory," Fuchs said. "But I don't see our company moving to Novell. We are going to try to get out of the proprietary vendor camp and maybe move forward by embracing some of the Internet technologies out there."

The Lightweight Directory Access Protocol has quickly become an industry standard for allowing common access to different directories.

"Novell's directory has a lot to offer, but no matter how big its market share is, there are still users of other directories out there that application vendors will alienate if they limit themselves to Novell's APIs," said Tim Sloan, director of messaging at Aberdeen Group, Inc. in Boston. ■

Wolfpack

Continued from page 23

it next to the old one, cluster them and then move the workload over or perhaps even split it between the two.

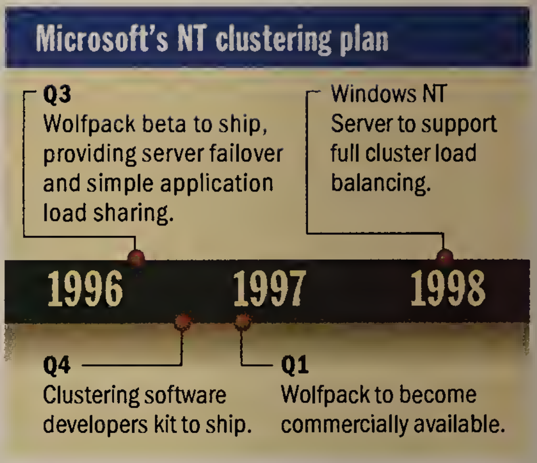
Will Wolfpack take a chunk out of Unix's share of the clustering market in the mid-range and high-end?

The marketplace is already looking at NT as an alternative to Unix. In fact, [International Data Corp.] says NT is outshipping all the Unix-based servers combined. So Wolfpack will fuel that trend.

With the developer's kit coming out, what kind of groundswell of application support do you expect?

There have been over 60 companies involved in the open process. Many of those are [independent software vendors], and many already have early versions of the developer's kit and specifications, so we certainly expect to see some Wolfpack-enabled applications coming to the marketplace shortly after release. We're fully expecting a very large marketplace to develop in cluster-aware applications. Microsoft will be making the BackOffice applications cluster-aware.

Will they be launched when Wolfpack comes out?



Microsoft's NT clustering plan

Q3
Wolfpack beta to ship, providing server failover and simple application load sharing.
Windows NT Server to support full cluster load balancing.
1996
1997
1998
Q4
Clustering software developers kit to ship.
Q1
Wolfpack to become commercially available.

That's getting a little ahead of the game. We haven't announced those plans yet. ■

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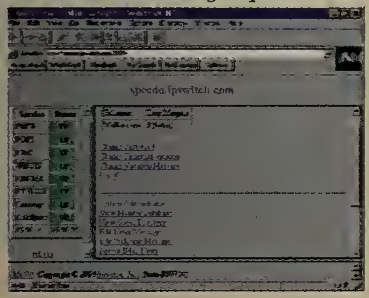
Briefs

Ipswitch, Inc. *of Lexington, Mass., will announce this week IMail Server for Windows NT 3.0, an upgrade of its* **Internet messaging server** *that now has built-in monitoring capabilities.*



In addition to managing server availability, IMail monitors disk capacity and other Windows NT services. The software notifies administrators via desktop alarm or pager when a problem occurs. IMail also supports remote administration via World-Wide Web browsers and multiple E-mail domains on a single server. Available now, IMail costs $495.

Ipswitch: (617) 676-5700.

Digital Equipment Corp. *last week announced ObjectBroker 2.6, a version of its* **object-oriented middleware** *that supports the Object Management Group's Common Object Request Broker Architecture (CORBA) 2 as well as Sunsoft, Inc.'s Java programming language. Available now, ObjectBroker 2.6 development licenses cost $2,500 for Windows NT and $5,000 for Unix. Client pricing is $149 per user.*

DEC: (508) 493-5111.

SoftArc, Inc. *last week announced FirstClass 4, a version of its* **client/server E-mail and groupware** *system that will allow access to virtually all its features — including mail, conferences, directory, calendars and databases — via Internet protocols. Users will also be able to use Web browsers to access their mailboxes. FirstClass 4 clients and servers will be available for Windows, Macintosh, DOS and Unix. The product will ship early next year; pricing is not yet available.*

SoftArc: (905) 415-7000.

Server software adds power to Web clients

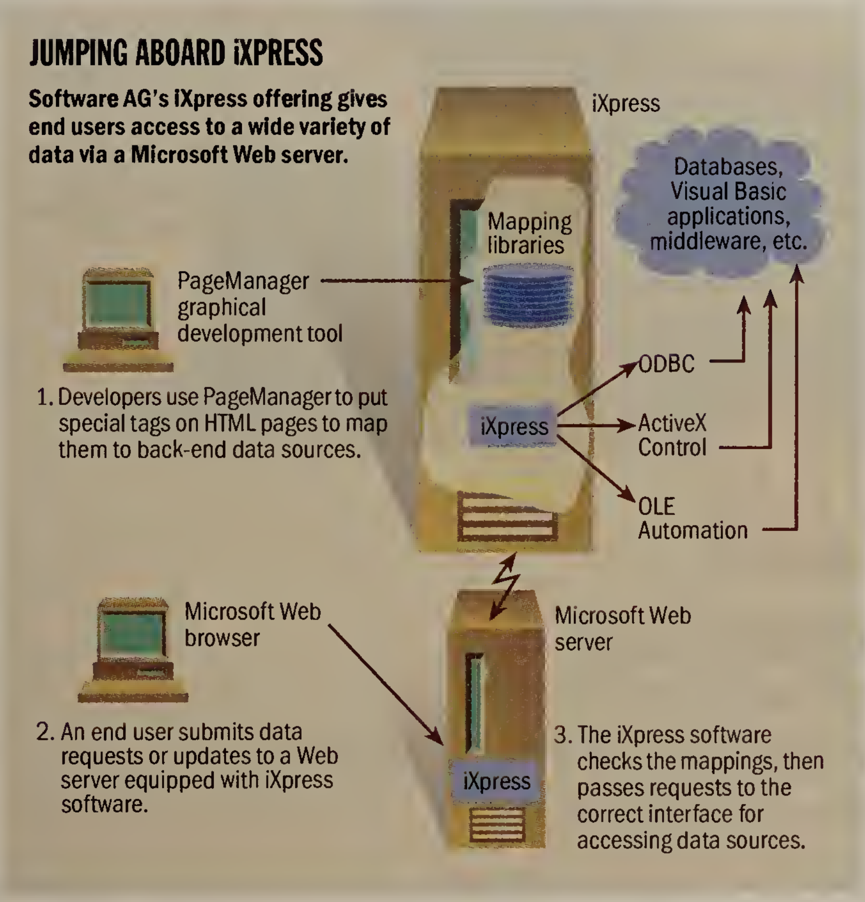
By John Cox

Vendors are turning client/server inside out to adapt to the Web's infrastructure and meet Web users' needs, as seen in two products being announced this week.

Both Software AG of North America, Inc. and Information Builders, Inc. are focusing on server software for accessing existing data and applications while generating Web pages to display results for browser clients. This approach is intended to speed response times, handle a large number of users, and minimize writing Web interfaces to access and manipulate existing data.

JUMPING ABOARD iXPRESS

Software AG's iXpress offering gives end users access to a wide variety of data via a Microsoft Web server.



1. Developers use PageManager to put special tags on HTML pages to map them to back-end data sources.

2. An end user submits data requests or updates to a Web server equipped with iXpress software.

3. The iXpress software checks the mappings, then passes requests to the correct interface for accessing data sources.

Software AG is releasing iXpress, which combines development tools, run-time code and management technology to marry Web pages more easily with back-end data sources (see graphic).

For optimal performance, iXpress supports Netscape Communications Corp.'s Netscape API and Microsoft Corp.'s Information Server API on the Web server instead of the Common Gateway Interface (CGI). It accesses data sources via Microsoft Corp.'s Open Database Connectivity, ActiveX or OLE Automation.

"This is a full-fledged, well-thought out architecture," said Tim Sloane, director of Internet messaging at Aberdeen Group, Inc., a Boston-based market research firm.

Software AG's iXpress is available now starting at $7,500 for Windows NT and Unix.

Separately, Information Builder's new WebFocus product features an English-like, server-based scripting language based on its Focus fourth-generation language and designed for generating database reports.

Ready-to-run CGI programs link a Web browser request, in addition to any information on a Web form, with the script the back-end databases via vendor-specific database drivers or Information Builder's EDA/SQL middleware. The report results are put into a Web page and sent to the browser.

WebFocus costs $6,500 for Windows NT and $105,000 for mainframes or large Unix servers. The NT and Sun versions will be available by August 30. Other platforms including HP-UX, AIX and MVS will be available sometime in September.

©Software AG: (800) 843-9534; Information Builder: (212) 736-4433.

GroupWise Web tool shows its mettle

University exploits GroupWise Web hooks during Olympics.

By Barb Cole

Atlanta

In post-Olympic evaluations at Georgia State University (GSU) here, Web-enabled groupware is receiving high marks.

GSU grades GroupWise's Web interface

Pros

▲Users have the flexibility of using any computer running a browser

▲Easy to set up and administer

▲Reliable

Cons

▼Slower response time

▼Some processes involve more steps than with regular mail client

▼Unable to send E-mail attachments

The school, located just blocks from the former site of the Olympic circle, let about 3,000 employees telecommute during the games by exploiting Web hooks to its groupware package — a beta version of Novell, Inc.'s GroupWise 5.

Shortly before the Olympic rush, GSU deployed the just-released GroupWise WebAccess, an add-on that lets any Web browser access the groupware system. The add-on enabled faculty members and employees from the offices of the registrar, accounting and information technology to work from home during days when the sprawling Southern city looked more like mid-town Manhattan.

The Web-based system — used mainly for E-mail but also for scheduling and workflow applications — proved to be reliable, according to Charles Hollingsworth, manager of networking services at GSU. "We had no failures directly related to the software, though we had some downtime due to a mail server problem," Hollingsworth said.

GroupWise's performance over the 'Net was only slightly slower than the high-speed network access most users were accustomed to. Users on the local network typically get an instant response when sending mail, but saw about a 1-second delay when using the system via the 'Net, Hollingsworth said. There were few complaints about performance, except from workers who had to rely on slower, 14.4K bit/sec modems.

In terms of functionality, little was sacrificed. Deleting mail entries, usually a point-and-click maneuver in GroupWise, became a multistep process when accessing the mail system via a browser. Users also had to give up the capability to send E-mail attachments.

In contrast to the remote access clients sold for most groupware systems, the Web browser interface streamlined setup, training and administration, according to GSU.

"Remote groupware clients are nice once you get them up and running, but they are a bear to install," said Sam White, network administrator at GSU. The glitches mostly result from setting up end users' modems.

ON LINE

See how other companies have used browsers to access internal networks, on Network World Fusion: Select News+.

Network World Fusion
http://www.nwfusion.com

Remote access clients would have required the university to set up and manage its own pool of modems, whereas WebAccess leverages the Internet to connect users to GroupWise servers.

Admittedly, the browser interface "doesn't do everything that the remote client does, but it does enough," White said.

In addition, GSU's standard Netscape Communications Corp. Navigator 2.0 browsers proved to be easy to administer and support during the games. ■

PED LOGIC

How free should the Internet be?

Nathaniel Hawthorne once observed that America's pioneers created successful colonies by building two structures prior to any others: a church and a jail. He noted that this was symbolic of humanity's higher and lower natures.

The effect of this policy was that civilized members of the community were able to pursue their belief systems in an environment that kept them out of harm's way. If we try to apply Hawthorne's observation to the Internet, which is our new global township, do we still need to build these two critical structures?

The real issue that Hawthorne raised, at least as it pertains to the Internet, is control. The church and jail provide means to controlling the behavior of different elements of society to improve the overall quality of life. When it comes to the U.S.-based Internet, control is provided by interpretation of the Constitution.

How the law will be interpreted relative to the Internet is still a question of the moment, especially as a slew of new Internet phone and conferencing applications hit the street.

For example, much of the interpretation of First Amendment law hinges on the question of whether the Internet is deemed a public or private forum.

Although online systems are privately owned, the Supreme Court has upheld that in, in some cases, a private forum may, for the purposes of speech, be considered a public forum. In a public forum, the courts are responsible for upholding the American tradition of open dissemination of speech. In a private forum, laws can more easily be enacted to regulate speech.

Marc Myers

In London's Hyde Park, there is a designated corner of the park known as Speaker's Corner. Since the first time I visited this location over 20 years ago, the site has changed little: You can still go there on a Saturday morning and listen to all sorts of radical talk from drunks, lunatics, foreign nationals and an occasional rising diplomatic star.

Speaker's Corner is certainly a benign example of the public forum. The Internet, however, is really quite different. From any place where access to a public telephone line is available, any person with a PC and a modem can instantly be heard across the entire planet. What has really changed is the economy of scale.

For example, new Internet applications such as Intel Corp.'s Internet Phone (www.intel.com/iaweb/cpc/phone), make it possible — according to Intel — to "use your favorite supported Internet white pages directory service to quickly find and call any registered user on the 'Net." This means cold calls from anywhere — at no cost to the caller.

CNN recently reported that the Police Department in Aurora, Ill., equipped six of its most "vigilant residents" with computers, printers and Internet access to pictures and descriptions of local criminal suspects. The Internet makes it easy to quickly exchange information and corner the bad guys.

Suppose all the vigilante groups decided to exchange information and pool their knowledge of criminal suspects? Would this data be of interest to the criminal suspects themselves? How can such usage possibly be considered the peaceful support of free expression?

There are more questions than answers. But one thing is clear: The Internet has no church and it has no jail. It's only a matter of time before government is going to have to step in and institute some controls on the freewheeling — and dangerous — Internet we have today.

Myers is CEO of Client/Server Connection, Ltd., a New York-based software development company. He can be reached via the Internet at mmyers@cscl.com.

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Briefs

■ **IBM** *this month will ship AntiVirus Version 2.5 for Windows 95 and NT, Windows 3.X, OS/2 Warp and DOS.*

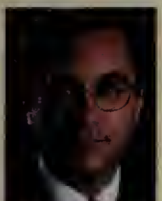
The software can **scan Internet documents for viruses** *before they infect the computer. AntiVirus 2.5 can detect and wipe out more than 8,000 different viruses, including the Concept virus and other Word macro viruses.The software costs$49.*

IBM: (800) 742-2493.

■ **Banc One Corp.** *has automated its back-end* **check processing** *operations with Open Market, Inc.'s OM-Axess Internet access management software.*

The bank's large cash management customers can now directly access their accounts over the World-Wide Web to get account information and images of their checks online.

■ *The Automotive Industry Action Group (AIAG), the trade association whose membership works to set communications standards for the auto industry, last week named* **Karl Schohl**, *staff development engineer for General Motors Corp., to be the business manager for the AIAG Automotive Network eXchange. This is a TCP/IP network for* **auto trading partners** *formed under the aegis of the AIAG.*



■ **CCOM Information Systems,** *the Iselin, N.J.-based maker of* **directory services** *and computer telephony products, last week unveiled two new products, the Intranet Directory Publisher and PhoneLine for the Intranet.*

The Intranet Directory Publisher publishes in HTML format the consolidated corporate directory resources compiled by CCOM's MasterDirectory data manager.

The client software PhoneLine for the Intranet lets users search and query the Intranet Directory Publisher using a standard Web browser.

CCOM: (908) 603-7750.

Microsoft plays conferencing matchmaker

By Ellen Messmer
Redmond, Wash.

Microsoft Corp. wants you to reach out and touch someone — across the Internet.

In a bid that could make the software giant the ultimate conferencing matchmaker for the 'Net, Microsoft is creating software called the User Location Service (ULS), a directory that lists users of multimedia conferencing and lets other users connect to them over an IP network with the click of a mouse.

NetworkWorld Fusion

For more information related to Intranet development, go to Network World Fusion (http://www.nwfusion.com). Select News+.

Over the years, users have grown used to audioconferencing, videoconferencing and data collaboration with two or more parties over circuit-switched networks. Traditionally, calls have been placed over the public phone network or over private lines.

Now, with the industry rallying around H.323, the International Telecommunication Union standard for conferencing over data networks (see graphic), the era of IP-based calling is set to begin in earnest, after the fitful start made by proprietary equipment.

However, setting up a data collaboration session based on another person's IP network address presents problems because a user's IP address can be variable.

For instance, a computer can have more than one address, or a network translator inside a firewall may be shielding addresses for security reasons. In some situations, hosts may be getting IP addresses dynamically through servers or Internet service providers.

To solve this problem, Microsoft developed the ULS, which lets conference users advertise themselves at a server and take calls. The ULS, which Microsoft is offering as a free software development tool kit, lets the client software continually tell the ULS server where you are and what your current IP address is.

The underlying User Location Protocol is an extension to the Lightweight Directory Access Protocol (LDAP), said Max Morris, program manager for Microsoft's Internet platform and tool division.

Blake Irving, group manger of the division, said ULS will be integrated into Microsoft's operating systems in the future.

A number of Web sites on the Internet, including the Voice in the Net, the C. Everett Koop Foundation, White Pines, Big Foot, and Microsoft itself are offering ULS to connect calls made with the H.323-based Internet phone software, said Irving. Corporations are also looking at ULS for use on intranets, he added.

The main drawback to ULS is that it lacks security controls to prevent tampering.

ULS includes ActiveX components so Windows-based applications can be easily added to ULS-initiated conferences, said Morris. The ActiveX Simple Conferencing API has 12 functions for adding con- ferencing support to Windows applications.

Microsoft's own data-collaboration product, NetMeeting 1.0, is proprietary.

But the Redmond giant will soon release NetMeeting 2.0 as an H.323 version for Windows 95, and plans to have an NT 4.0 version in beta later this year and a Macintosh version by the middle of next year. ■

H.323 AT A GLANCE

The H.323 standard for conferencing over data networks is actually a set of standards for:

- data conferencing
- audio conferencing
- videoconferencing
- multipoint bridges
- gateways to H.324 videoconferencing over a regular phone line and H.320 ISDN-based videoconferencing products
- audio gateway to standard phone service

The H.323 standard was finalized in May by the International Telecommunication Union, Geneva, Switzerland.

Start-up claims its latest Intranet development tool packs a Wallop

Wallop to let developers store and reuse key Web site components.

By Ellen Messmer
Foster City, Calif.

Start-up Wallop Software, Inc. this week will release the beta version of its namesake software, a programming environment that lets a team of developers working on an intranet application integrate the output of a variety of Web authoring tools.

Wallop lets developers organize and manage output for HTML, GIF, Java, ActiveX, or C++, and display the components and the Web links visually. Corporations using the alpha version of Wallop to develop their intranet applications said it makes it easy for developers to store code and reuse it.

"We're working on an HTML-based human resources system and 401(k) plan using Wallop with our own HTML editor," said Bernie Miller, chief information officer at modem and communications software manufacturer Global Village, Inc.

Software objects, such as a corporate logo, for example, can be stored and retrieved easily using Wallop, Miller said.

Wallop combines the decision logic and transaction capabilities found in a traditional client/server development environment with the ability to integrate documents, images, sound and animation generated by the new breed of multimedia Web tools.

Global Village, based in Sunnyvale, Calif., is using Wallop to write a set of workflow intranet applications.

"There just isn't any Web-based 401(k) application out there today, so we have to write our own customized one," Miller said.

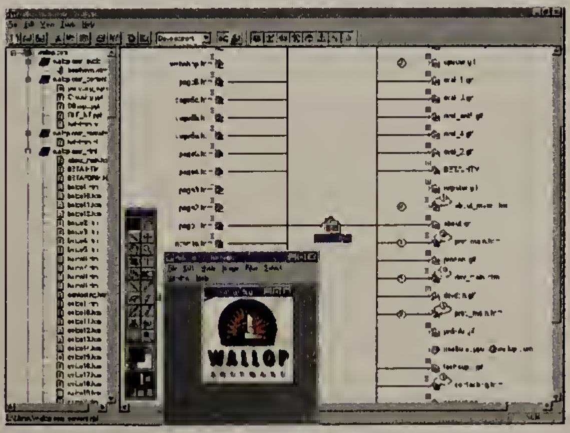
The company's 400 employees in three different cities will be able to get information from Web servers using a Java-enabled Web browser.

The employees will then be able to submit questions or requests to division managers through the workflow-based intranet.

Wallop Software was started last year under the name NetBuild, Inc.

Believing the name lacked a certain pizzazz, the company's executives, who include Bill Daniel as president, ditched the original name in favor of one they believe packs a greater punch.

©Wallop Software: (415) 341-1177.



With Wallop, *developers can build sites using an array of authoring tools. The product also stores and catalogs Web site components.*

Wallop *CFO Rob Bolt promises to ease intranet development.*

"I started running OS/2 Warp Server on all my networks and guess what?

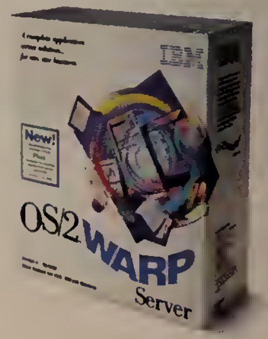
My rainy days are over."

Consolidate

It was time to think about consolidating the company's mixed environment network onto one operating system. That's why Steve Conaway, Director of Computer Services at the Financial Times, decided to check out the new release of OS/2® Warp Server.

In no time at all, Steve was waxing poetic over OS/2 Warp Server's ability to handle blockbuster-sized databases and make Internet and intranet access a breeze. He was also impressed with all the advanced printing capabilities and management features that simplified the running of both his network and his life. Which is why Steve now thinks of OS/2 Warp Server as his umbrella network operating system.

Find out what got Steve so excited. Call 1 800 IBM-2468, ext. EA130, or visit us at www.software.ibm.com/info/ea130 for details. With special offers of additional software (valued at up to $1,400) available when you buy OS/2 Warp Server and Lotus Notes® before September 30, 1996, there's really no better way to demonstrate fiscal responsibility.



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A Network World Supplement

August 1996

INTRANet magazine

Star power

How the right Web server can energize your intranet world

Also inside

- Intranet shines at Sun
- Review: NetWare Web Server
- Of policies and intranets
- Knowing your Web whereabouts
- Managing documents, Web style

Capitalizing on Internet Technologies

IF YOU'RE RUNNING AN INTRANET WITHOUT LOTUS NOTES, YOU'RE BARELY SCRATCHING THE SURFACE.

Intranets are a great tool for sharing information. To get the most out of them, look to Lotus Notes®. With Notes™, you can now build intranet applications using the latest Internet technologies. And with the new interactive Web application server, code-named Domino, you can run them with standard Web browsers. Over 12,000 Lotus business partners can help you build and deploy applications that transform your intranet from a static publishing vehicle into an interactive environment for business collaboration. Notes' state-of-the-art replication gets the latest information to the people who need it. And with Notes' RSA Data Security, only those who need it.

For more information on how Lotus can help you manage the cost of your intranet, explore Lotus on the World Wide Web at www.lotus.com or call 1-800-828-7086, ext. C188. In Canada call 1-800-GO-LOTUS. ©1996 Lotus Development Corporation, 55 Cambridge Parkway, Cambridge, MA 02142. Lotus and Working Together are registered trademarks and Notes is a trademark of Lotus Development Corporation. All company names are registered trademarks of their respective companies.

Notes natively supports all popular Web standards too. HTML 3.2 and HTTP, SSL, SLIP/PPP, SNMP, and TCP/IP, POP3 and SMTP. And with ActiveX™, Java® and Netscape® Plug-in API support, all the Web applications you're developing today will automatically work with Notes.

COMPARING INTRANET COSTS**

	Notes	Microsoft	Netscape
Server Price	$495	$5,773	$3,680
Client Price	$55	$93	$135

** For equivalent functionality as per Microsoft and Netscape Web sites 6/7/96. Visit www.lotus.com for more information.

More important, Notes does all this at a fraction of the cost of alternative products from Microsoft® and Netscape.

Take a closer look at a Notes-powered intranet. It'll open your eyes.

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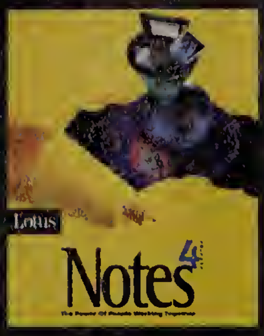

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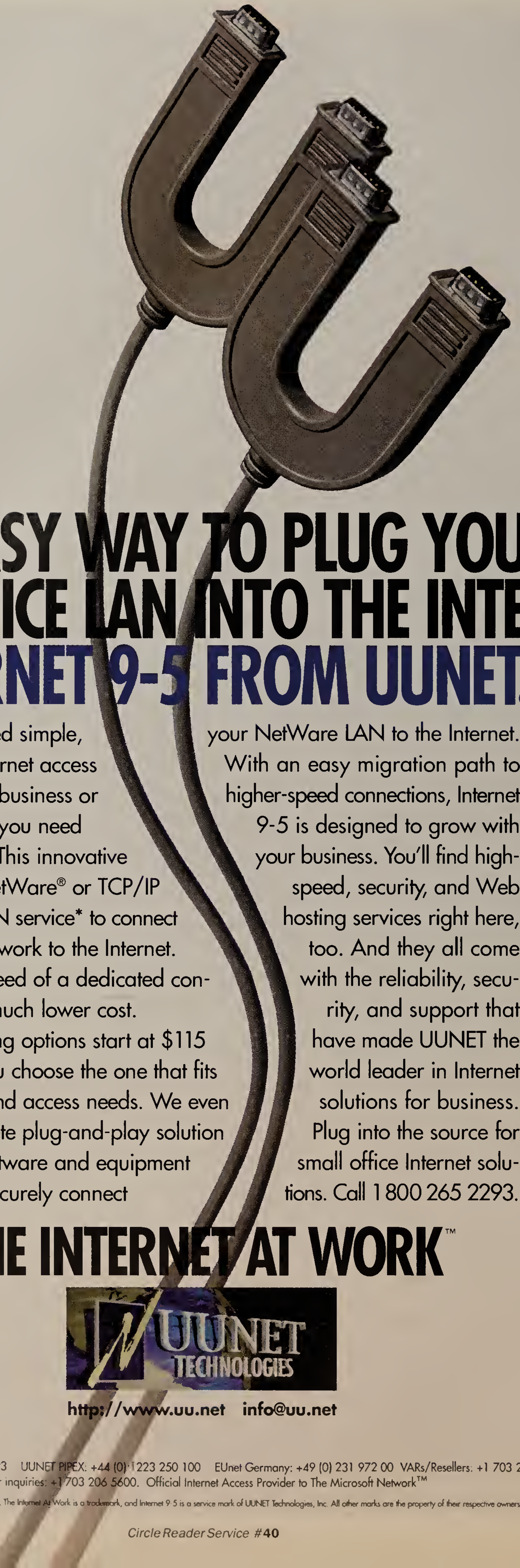

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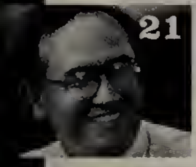
IntraNet™

August 1996
Volume 1, Number 3

FEATURES ●



21 More than just one piece of the puzzle

Like quarterbacks, Web browsers and servers get all the glory. But it takes more than a graphical interface and some HTML pages to make an intranet. A Q&A with William Hawe, technical director and top strategist for Digital Equipment Corp.'s Network Product Business unit.

28 Tending the wild and woolly intranet

Thinking about letting your intranet run free as a little experiment in self-management? Think again. Intranet pioneers are learning that carefree publishing policies can be bad business.

31 Intranet shines at Sun

Sun Microsystems, Inc. and its live mascot — a dog named Network — both follow a simple rule of survival: Don't bite the hand that feeds you. Sun feeds Network, and according to officials, he doesn't bite. But the company also feeds itself, with arguably the highest per capita corporate installation of Web pages running on an army of its own servers.

35 You are here

Clicking your way through a Web can be fun, unless you're in a hurry. Some intranet architects are making it possible to jump to particular locations without requiring users to follow a trail of hyperlinks.

37 COVER: Star Power: How the right Web server can energize your intranet world

Web servers are the solar center of your intranet system, the source of heat and light. Your choice of Web server will determine whether your planetary browsers revolve around a young red giant or an aging solar dwarf.

Cover photo by Nick Kondis.

40 Managing documents, Web style

Team the sophistication of a document-management system with the simplicity of a Web browser and watch the information flow.

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The emerging W3C style sheet standard will make changing the appearance of Web documents less of a bear.

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If you're running NetWare 4.1, it would be logical to implement Novell, Inc.'s Web server for your intranet. But even if 4.1 is nowhere to be found in your environment, the NetWare Web Server might still be the right choice.

Product Watch: An analysis of intranet product news 23
Not even spiders on steroids could weave such spontaneous Webs. But with corporate Webs linking disparate systems, databases and resources, some users face information overload. New products focus on ways to help deal with the volume of data turned up by browsers.

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Memo to MIS: Gibbs uncovers the following is a transcript from a secret meeting held in your cafeteria. You might want to take action real quick and get that intranet server running ASAP.

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From the Editor

There's an adage that says the easier things seem, the more difficult they are. Those words ring true for intranets.

Intranets can be extremely easy to build: You take your Web server, your browsers and your HTML documents — painlessly converted from their original format using a handy tool — put them all together, and presto: Up springs a private Web.

It's no wonder intranets are flourishing in corporate America. Department heads, project managers, team leaders and whoever else is so inspired can build application fiefdoms without any input — or, as some might see it, intervention — from the information technology folks. They can quickly and easily share the information they need to do their jobs, and even have fun with it, too.

This trend takes a development burden off of IT's shoulders, but does not necessarily result in a robust, enterprisewide intranet. IT managers looking at the bigger picture face a variety of challenges, not the least of which is one of perception.

Since intranets are relatively easy to build and come fairly cheap (many of the tools are free for the taking off the Internet), the tendency may be to dismiss them as nonstrategic.

In our cover story, Tolly Group President Kevin Tolly encourages companies to take the intranet, particularly Web servers, seriously. "I don't think Fortune 500 companies have thought about it enough to be nervous or skeptical, but the Web server is a key part of their entire enterprise environment," he says.

The long and short of it: Companies have to remember not to trivialize this wonderful new Web technology.

Beth Schultz, Executive Editor (bschultz@nww.com)

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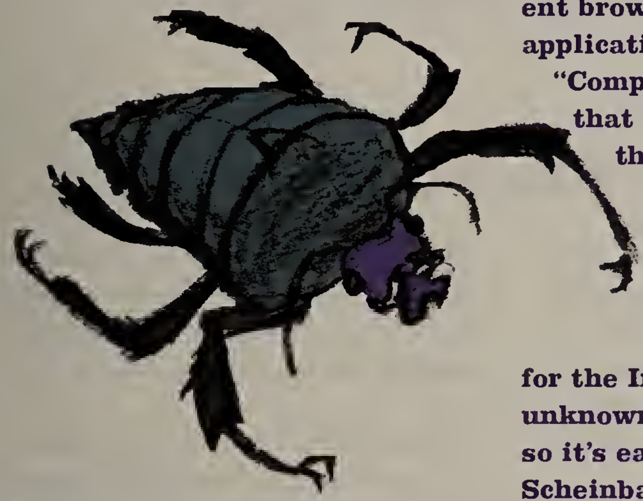


ILLUSTRATION BY BETSY HAYES

Working out the bugs

ST Labs will test your intranet applications before you put them on the Web.

Want to make sure that nifty application you've just been handed doesn't crash the corporate Web?

ST Labs, Inc. (www.stlabs.com) will put your software through its paces at a new Internet/intranet testing facility it has opened in Bellevue, Wash. The firm will approximate real-world scenarios for its clients so they get a feel for what will happen to the applications when put on the Web, says Chuck Scheinbaum, a test leader at ST Labs.

"We'll do a run-through to make sure there are no surprises," Scheinbaum says.

Much of the intranet software testing ST Labs expects to undertake will have to do with compatibility, Scheinbaum says. If a company has decided to run Microsoft Corp.'s Internet Information Server software on a Windows NT server, then ST Labs can investigate how different browsers would view the application, for example.

"Companies want to make sure that when someone jumps on the Web site it doesn't look bad," Scheinbaum says.

In this regard, testing for the intranet is less complicated than checking software destined for the Internet. Far fewer unknowns exist on private Webs, so it's easier to focus a test, Scheinbaum says. You can test two or three browsers as opposed to six or so, for example.

ST Labs also expects to do heavier security and reliability testing for intranet software, Scheinbaum says.

Regardless whether testing for the Internet or intranet, the lab's focus is on fast turn-around time. "On the Internet, things are moving so rapidly that it seems everything has to be done yesterday, so we try to get everything set up really quickly and focus on the testing," Scheinbaum says.

ST Labs has set up its dedicated Internet/intranet testing facility so that it can quickly mimic a client's Web environment. It has configured its servers with removable hard drives so that it can easily swap out operating systems or software applications. It also will have a wide variety of reconfigurable client machines running various operating systems.

Testing: 1, 2, 3

ST Labs offers a variety of services for Internet/Intranet applications developers. Testing can be conducted on the following parameters, for example:

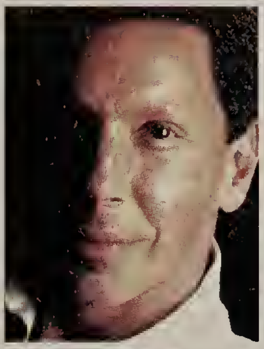
- Compatibility
- Functionality
- Interoperability
- Ease of Installation
- Performance

Oracle Webizes databases

Swigging strawberry ice tea and joking about the tech stock roller-coaster ride occurring as he spoke, Oracle Corp. CEO Larry Ellison unveiled tools to tie transaction processing to the Web, and particularly to intranets.

The pairing is intended to provide reliable transaction processing in intranet environments by securely linking Web pages with Oracle databases. Ellison says Oracle's new products and tools will support two-phase commit, transaction rollbacks, and other relational database operations often lacking in database transactions involving Web tools.

Oracle's offerings include browser-accessible versions of its vertical applications, Webized Designer/2000 development tools, and WebServer 3.0. Reappearing is Oracle's ConText technology, which searches and summarizes SQL databases; Oracle has been refining the technology for years, and will now open it to a Web interface.



Ellison says the operating system should be irrelevent.

Ellison, following arch-rival Microsoft Corp.'s own intranet strategy briefing by a month, even sent a few snipes northward. A favorite topic: the Network Computer (NC) that he says makes operating systems irrelevant because it runs transparently whatever is loaded. "The operating system is anonymous," Ellison declares. "The introduction of a new operating system should not be a major cultural event."

Was it only a year ago that Windows 95 made its debut at a Microsoft circus?

TICK, TICK, TICK

The Business Research Group recently asked 100 intranet managers how long they spend deploying and maintaining the applications running on the corporate Web. Of the folks they interviewed, half base those applications on Lotus Development Corp'.s Notes and InterNotes Web Publisher. The other half use either public domain software or Web products from Digital Equipment Corp., FTP Software, Inc., IBM, Microsoft Corp., Netscape Communications Corp., Oracle Corp. or O'Reilly & Associates, Inc.

It looks as if Notes administrators may have an easier time loading the intranet with applications: Study results show the overall implementation of intranet applications took an average of 53 days with Notes as opposed to an average of 87 days with other intranet products. While time estimates varied according to the complexity and size of the applications, Lotus Notes was approximately 40% more efficient on average, says BRG, a market research firm in Boston. Heres a breakdown:

Total hours to deploy application

Application	Number of hours with Notes	Number of hours with other intranet products	Fewer hours for Notes
Document publishing	104	122	15%
Electronic mail	67	108	38%
Database access	93	214	57%
Discussion databases	105	162	35%
Workflow	66	148	55%
Transaction processing	26	239	89%

Total hours per week for maintenance

Application	Number of hours/ week for Notes	Number of hours/week for other intranet products	Fewer hours for Notes
Document publishing	8	16	50%
Electronic mail	7	12	42%
Database access	8	27	70%
Discussion databases	6	14	57%
Workflow	4	17	76%
Transaction processing	3	18	83%

hot links

Intranet builders play the field

Survey results keep pouring in, and the overwhelming conclusion is that intranets will reign supreme within the enterprise.

The latest evidence supporting that assertion comes from Delphi Consulting Group, Inc. in Boston. The firm, after surveying buyers, evaluators and users of intranet products at 400 Fortune 1,000 firms, says intranets will quickly grow to dominate the enterprise.

Those surveyed say a full 90% of their organizations are evaluating intranet solutions. This represents an "astounding shift" from six months ago, Delphi says.

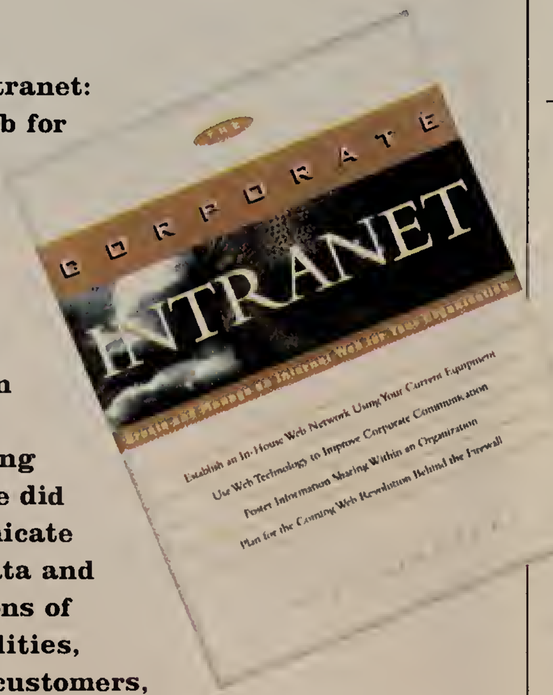
More than 50% of survey respondents say Web-based browsers will become the dominant desktop environment, but that they're not sure which browser in particular will win. Only 10% believe Netscape Communications Corp.'s Navigator will prevail. But that doesn't mean they see Microsoft Corp. taking over: Only 20% of those surveyed say Internet Explorer or another Microsoft product will own the desktop.

90% of those surveyed said their organizations are evaluating intranet solutions.

Neither were respondents putting money on the network computer concept espoused by Oracle Corp. CEO Larry Ellison. They anticipate the NC will capture only 20% of the market five years from now.

Delphi President Thomas Koulopoulos says the survey results demonstrate "the importance organizations are placing on cross-platform solutions." Corporations are clearly building intranets with an eye toward industry standards, not toward establishing an allegiance to a single or even a dominant vendor.

Summer reading


THE
CORPORATE
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Establish an In-House Web Network Using Your Current Equipment
Use Web Technology to Improve Corporate Communication
Foster Information Sharing Within an Organization
Plan for the Coming Web Revolution Behind the Firewall

The new book "The Corporate Intranet: Create and Manage an Internal Web for Your Organization" has a lot to offer intranet newbies and veterans alike.

"Systems have been reengineered en masse and organization charts have been streamlined to a fare-thee-well," writes author Ryan Bernard. "And yet, despite this tremendous effort, we are still facing many of the same problems that we did 10 or 20 years ago: how to communicate and manage the vast streams of data and information created daily by millions of office workers, manufacturing facilities, design teams, dealers, sales reps, customers, and suppliers worldwide."

Enter intranets. Bernard steps the reader through everything from what businesses can learn from the Internet to "A new kind of information system," and finally, "The corporate intranet in practice," the latter discussing how companies such as Digital Equipment Corp., Chevron, Sun and Nortel are using intranets.

The book, published by John Wiley & Sons, is a good read and worth a look.

ILLUSTRATION BY BETSY HAYES

Web technology unlocks the data warehouse

It's starting to look like Web technology just might open the doors to the data warehouse wide enough to let someone other than an MIS manager or other technical expert peek at what's inside.

Web browsers make it easy for the average Joe to enter the data warehouse, says Russell Lipton, an analyst with The Meta Group, Inc., a market research firm in Westport, Conn. "Web technology in intranet form is going to open data warehouses in ways these systems were intended," Lipton says. "The browser gives you an additional means of communication and information retrieval."

Web technology, for example, makes it feasible for corporations to provide access to portions of data warehouses to partners and customers who reside outside the firewalls, Lipton says.

And thanks to Java technology, such access won't be limited to static retrieval. Users will be able to run ad hoc queries and generate reports. What's more, Web search engines will be able to peruse data warehouses, too, Lipton says.

Within corporations, "it'll be decision support systems and online analytical processing for the masses," Lipton says. "Intranet Web technology is a new medium. It offers the possibility to deliver the data warehouse for the rest of us."

Unix crowd rocks

What do T-shirted Unix programmers, suit-clad high-tech executives and San Francisco relic Jefferson Starship have in common? Not much, but that's the lineup for this month's annual SCO Forum, sponsored by The Santa Cruz Operation, Inc.

Between rock tunes and partner talks, the Santa Cruz, Calif., firm will show its recently shipped SCO Internet Family (also aimed at intranet installations). The product family includes SCO Internet FastStart, which is a repackaged version of Netscape Communications Corp.'s Web server of the same name, plus an Internet-to-NetWare Gateway, Web browsers and security products.

SCO has made intranet and Internet technology a corporate priority, and is drawing on a growing list of industry partners to flesh out its plans. In addition to Netscape, SCO has forged alliances with Sun Microsystems, Inc.'s JavaSoft unit and search engine provider Verity, Inc.

At the forum, SCO will discuss topics such as Java and the network computer. What's more, it plans to give attendees a peek at a new groupware offering code-named Gemini. To launch this product, SCO has merged its OpenServer with UnixWare, which it acquired a couple of years ago from Novell, Inc.

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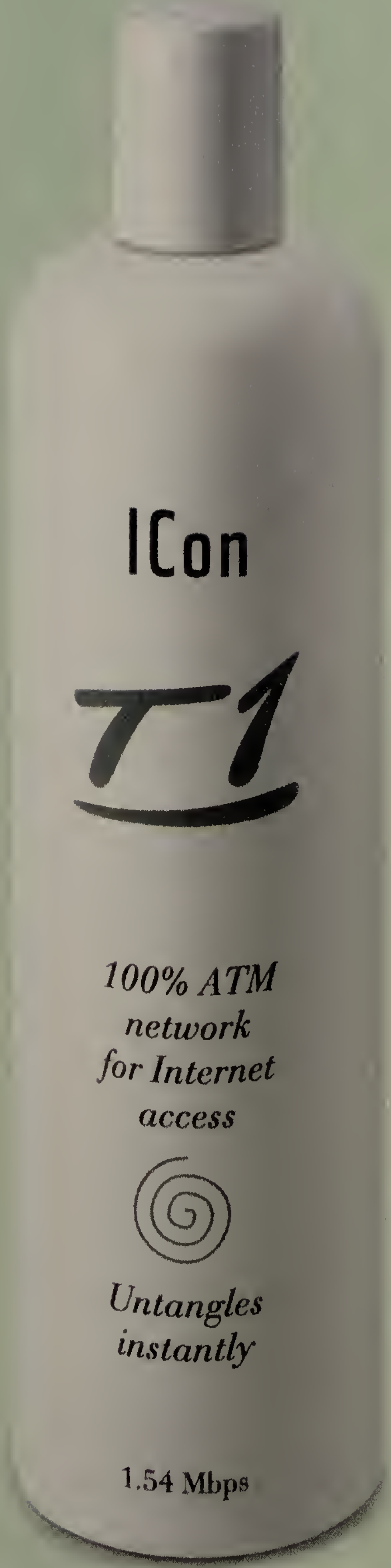

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Circle Reader Service **#32**

Cascaded Style Sheets: Attractive Web pages instantaneously

BY JIM HAMERLY

As the urge to develop and publish Web pages spreads throughout an organization, intranet administrators often find themselves faced with the daunting task of bringing a corporate look and feel to the myriad documents being posted.

Many companies view the development of graphically consistent and visually stimulating pages as a key factor in enhancing communications, streamlining information gathering and simply adding value to an internal Web's content and structure. This means intranet designers need tools that will let them easily create attractive, stylistically consistent Web pages and alter the appearance of multiple pages with little difficulty.

The requirement for easy page manipulation has driven an innovation known as Cascaded Style Sheets (CSS).

A template for change

Style sheets define the format, layout and general appearance of the elements in an HTML document. An intranet designer, for example, could use style sheets to specify the fonts, colors, spacing and other characteristics of headlines, body copy, tables, images and most other page elements.

STYLISH LOOK

Intranet designers can use style sheets to specify the fonts, colors, spacing and other characteristics of headlines, body copy, tables, images and most other page elements. Here's a simple behind-the-scenes look of a document marked with HTML tags and style sheet specifications.

Structure	Web page	Style
<H1>	**This is a first-level heading**	(font-family: Times; font-style: roman; font-size: 14; position: center color: blue)
<P>	This is a paragraph following the first-level heading. It's structure definintion is a paragraph, and its content consists of two sentences.	(font-size: 12; position: left; color: red)
<P>	This is the second paragraph in this document.	(font -size: 12; position: left;)

Similar to templates used in desktop publishing, style sheets allow documents to take on a standard look and feel through the use of a basic set of codes stored in a single file. All the intranet designer has to do is make a change to the style sheet and all the Web pages associated with that file are updated, too.

When thinking about style sheets, it helps to break a document into its three basic elements: structure, style and content.

The structure describes the type and ordering of elements. For example, this article is structured with a headline, "Cascaded Style Sheets: Attractive Web pages instantaneously," three introductory paragraphs, the subhead "A template for change" and so on.

The style describes how elements are visually formed and placed on the page. Stylistically, the headline for this article is in a larger point size than the subheads, which are larger than the body copy, for example.

The content, of course, is the actual information contained in the element.

CSS is being standardized by the World-Wide Web Consortium (W3C), a group of companies working together to define, enhance and refine Web-related standards. The W3C expects to finalize the CSS standard by year-end.

Several intranet browser and authoring tools, however, already support part or all of the standard. The list includes Microsoft Corp.'s Internet Explorer 3.0, GNN's GNNpress and SoftQuad International, Inc.'s Panorama. Support also is expected in upcoming versions of DigitalStyle Corp.'s WebSuite Web graphics tool, Netscape Communications Corp.'s Navigator browser and Spyglass, Inc.'s Mosaic browser.

HTML-like properties

CSS, a text language, is approximately as complex as HTML. This means authors of HTML documents should be able to easily create and edit CSS files. Users can expect to see integrated style sheet and HTML authoring tools that let them edit content and style directly.

CSS offers two primary benefits: It allows stylistic information to be added to an HTML document, and it enables stylistic factors to be specified at one level of the document and cascade further into it.

For example, the font size of a title is typically larger than that of the following paragraphs. To maintain a reasonable balance, the font size for paragraphs could be specified as a percentage of the title. This capability allows attributes of one element (in this case, the title) to maintain a relationship to some other element (in this case, the subsequent body copy).

See Handbook, *page 13*

ASK DR. INTRANET

David Morro is in for consultations. He'll help diagnose your intranet ailments or recommend corrective measures. Send your questions to the doctor via phone at (312) 283-0213, fax at (312) 283-0214 or the Internet at dr.intranet@nww.com.

Our company's sales force relies entirely on laptops and remote connectivity. How can I provide it safe, secure intranet access?

Encryption is the first step. If you're setting up a distributed intranet application with data traveling over a public network, you'll want to use a secure Web server, such as Process Software Corp.'s Purveyor, that encrypts HTML pages before transmitting them. Web browsers requesting HTML documents from a secure server must have the correct unique code, or key, in order to decode and view the encrypted pages.

Of course, laptops are easily portable, which unfortunately means they're easily stolen. What if a laptop on your intranet is stolen with the encryption key already installed in its Web browser? You can neutralize this problem by requiring laptop users to log into a secure dial-up service or firewall before they get access to the intranet server.

What benefits do I get from using proxy servers on my intranet?

You get several pluses, especially if you're running a large corporate Web.

When a client is configured to request an HTML page on your intranet site from a local proxy server, the proxy server requests that file from your Web server, copies it, then sends it to the client. The next time a client using the proxy server requests that same file, the proxy returns the cached copy of the document.

This configuration improves user interaction with your intranet, especially when the Web server is remote. This speeds file downloads and reduces overall network traffic.

Additionally, some proxy software, including Microsoft Corp.'s recently released Catapult server beta, does not require TCP/IP on intranet clients. Rather, the proxy software handles all TCP/IP interaction with the Web server and uses existing network protocols, such as Novell, Inc.'s IPX/SPX, to communicate with the clients.

Morro is a Web architect at Interse Corp., a Sunnyvale, Calif.-based Web development firm.

Microsoft Corp. operates a Cascaded Style Sheets Gallery on the World-Wide Web. Visit it at http://www.microsoft.com/

The CSS spec is specific to HTML documents but should easily scale to more general SGML if desired.

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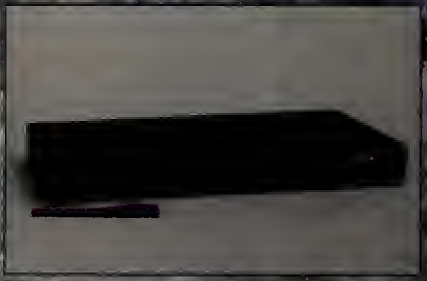

The landscape of remote access is changing and Colorado is equipped to handle the most demanding twists and turns. It is available with an Ethernet or Token Ring LAN interface and supports three WAN connections and an optional ISDN Basic Rate Interface. Another model, Colorado Plus, supports all the features of the Colorado but includes two Ethernets or an Ethernet and a Token Ring interface.

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- **Amazon** Central Office Router

Circle Reader Service #26

Handbook, *continued from page 10*

Additionally, the type color could be established for the title and cascaded into the following paragraphs, rather than being specified independently for each element. This capability allows general stylistic properties to be specified once; as new elements are added to the document, they automatically inherit the cascaded properties.

By altering the style sheet, the document's appearance and layout can be changed independently of its content and structure.

A touch of style

Style sheets can be stored within the document or in a separate file to which the document refers. In the first approach, the style sheet is in a sense bolted to the document: Wherever the document goes, including onto the intranet, so too goes the style sheet.

In the second approach, any number of documents can share a style sheet. A company, for example, could create a style sheet for its letterhead. When sending out letters, employees would access the style sheet file to ensure that the correspondence bears the proper logo, fonts and style.

FIND IT ON FUSION

Look for more information on Cascaded Style Sheets on Network World Fusion (http://www.nwfusion.com). Click on IntraNet Magazine.

NetworkWorld Fusion

On an intranet, documents can contain hyperlinks to their external style sheets. As a browser downloads an HTML document, the related style sheet comes with it so that the document will be displayed properly.

Multiple style sheets also can be used in designing a single document. Body copy might use one style sheet while tables use a second.

CSS provides Web developers and users with a number of advantages. Those include:

- Giving users the ability to control the design of a Web site. With CSS, users can control margins, line spacing and placement of elements on the page, as well as specify fonts, type sizes and colors. This provides the same degree of control users expect from their familiar word-processing and desktop-publishing applications.
- Allowing users to easily define and implement a common look and feel across the entire Web. This is accomplished by sharing a style sheet among HTML documents or authors.
- Reducing the amount of time Web designers need to spend reformatting or creating new page or site layouts. For example, a user can change all of the headlines on the page or site to a larger font by making a single change in the style sheet.
- Facilitating the use of Web-formatted data in other venues, such as in a brochure or in an E-mail message.
- Streamlining the authoring of HTML documents. By using external style sheets, the HTML document is not cluttered with extra formatting tags. This makes changes to Web documents cleaner and easier.

The initial version of the CSS standard provides the rather elementary control of page layout and appearance that users have been asking for. However, the W3C expects to extend the capabilities to less conventional functions. One day, it may be possible to specify a style sheet for a graphical element's length, width and color, the timing of multimedia elements and other page components, such as audio.

Hamerly is president and CEO of Digi-talStyle Corp., a Web tools developer in San Diego — jim@digitalstyle.com.

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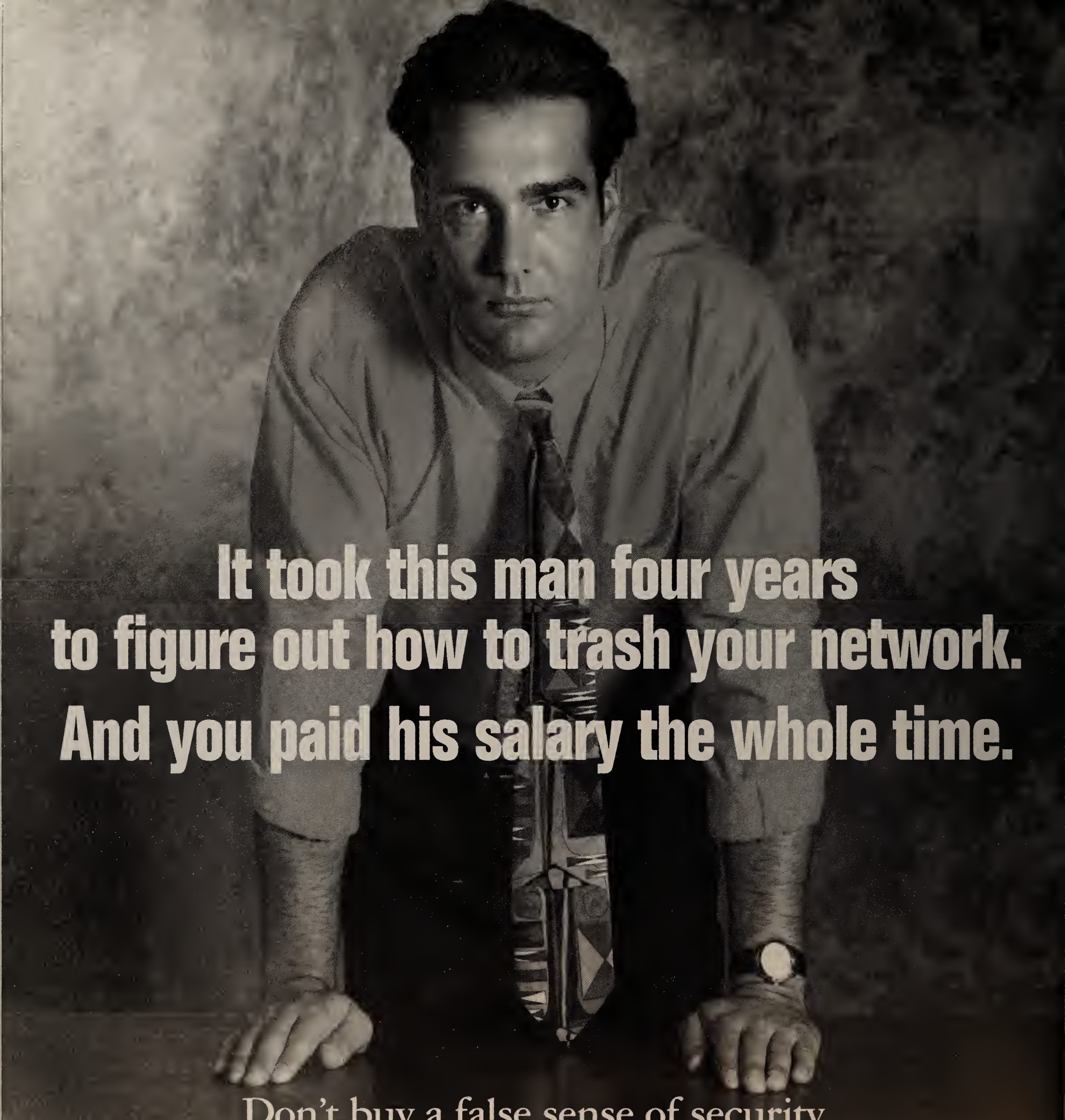
Circle Reader Service **#28**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Circle Reader Service **#37**

Novell's NetWare Web Server:

Industrial-strength intranet service

BY MARK GIBBS

Certainly, if you're running NetWare 4.1, it would be logical to implement Novell, Inc.'s Web server for your intranet. But even if that network operating system is nowhere to be found in your environment, the NetWare Web Server might still be the right choice.

In either case, if your overriding concern is document delivery, Novell has a compelling story: In a joint test conducted earlier this year, Shiloh Consulting and Haynes & Co. benchmarked NetWare Web Server 2.5 as the fastest such product available.

The firms tested Novell's server against Microsoft Corp.'s Internet Information Server 1.0 (Windows NT 3.51 SP3) and Netscape Communication Corp.'s Communications Server (Windows NT 3.51 SP3). When servicing 128 clients, Web Server 2.5 was about 16% faster than IIS and four times faster than Communications Server.

Novell squarely positions NetWare Web Server 2.5, released in June, as an intranet solution (most strongly as part of its InnerWeb Publisher suite). And for the most part, the company is on target with an impressive product. The release takes only about 20 minutes to install, delivers excellent performance at about double the rate of the earlier Version 2.1, comes with PERL and BASIC interpreters for developing backend applications, and supports browsing of Novell Directory Services (NDS).

PRODUCT CAPSULE

- **Name:** NetWare Web Server
- **Current release:** Version 2.5
- **Price:** $995
- **Server requirements:** 16M bytes of RAM, 2.5M bytes of hard-disk space, (100M bytes if installing NetWare Runtime and building a new Web server,) CD-ROM drive for installation
- **Client requirements:** 386 PC, 4M bytes of RAM, 2M bytes of hard-disk space, CD-ROM drive for installation, Windows 3.X, 95 or NT
- **Vendor:** Novell, Inc. of Provo, Utah
- **Contact information:**
  - Telephone: (800) 638-9273
  - Fax back service: (800) 652-0139
  - Web: www.novell.com

On the downside, the product doesn't actually include any useful intranet applications to help you get started. A simple human resources database or perhaps a staff directory system would have been a nice inclusion. As it is, the only relevant demonstration is a weak staff telephone directory application.

Another drawback is the documentation, which is unevenly edited and not particularly well-organized or thorough. In addition, the installation utility could be improved and extended.

Getting up and running

NetWare Web Server requires NetWare 4.1 with NDS. For those users not running this version of the software, Novell has included NetWare Runtime 4.1 with the product. The runtime release only supports a single administrative user.

Installation, done through the system console utility Install, takes less than 20 minutes. At the end of the process, you are prompted for the server name and an administrator password. The password is needed when the server needs to be restarted to load configuration changes, for example.

By default, a subdirectory called Web is created under the root of the server's sys volume. A number of other subdirectories follow. They include: Docs, the Web server's document root directory (with one exception, the Web server will only supply documents from the subdirectory tree below this point); Config, which stores the configuration files; and Scripts, where BASIC and PERL files are stored.

The Web server, which is based on the National Center for Supercomputing Applications (NCSA) HTTP server, supports all of the expected standard facilities: activity logging, image mapping and the ability to run back-end applications. The Web server's console display provides a rolling list of transactions and statistics on performance.

Whip and chair

After installation, you can find the configuration and management utility, Webmgr, in the server's Public subdirectory. This is an odd utility in that you need to connect a logical drive to the NetWare server's Web directory, under which it is expected the Config subdirectory will exist. Whew.

Once you've successfully made this connection, you can use Webmgr to change the configuration and browse the various activity log files that are generated. It's surprising that Novell hasn't made the same management services available as a series of Web pages.

The first set of configuration options cover basic server attributes — name, appropriate TCP/IP port, administrator's electronic mail address and root document and log directories.

You also can enable documents to be served from users' home subdirectories, which are defined in the individual user profiles in NDS. This is a useful feature that lets users easily publish their own documents. You also must specify a standard name below the user subdirectory for the subdirectory that will actually hold the user documents.

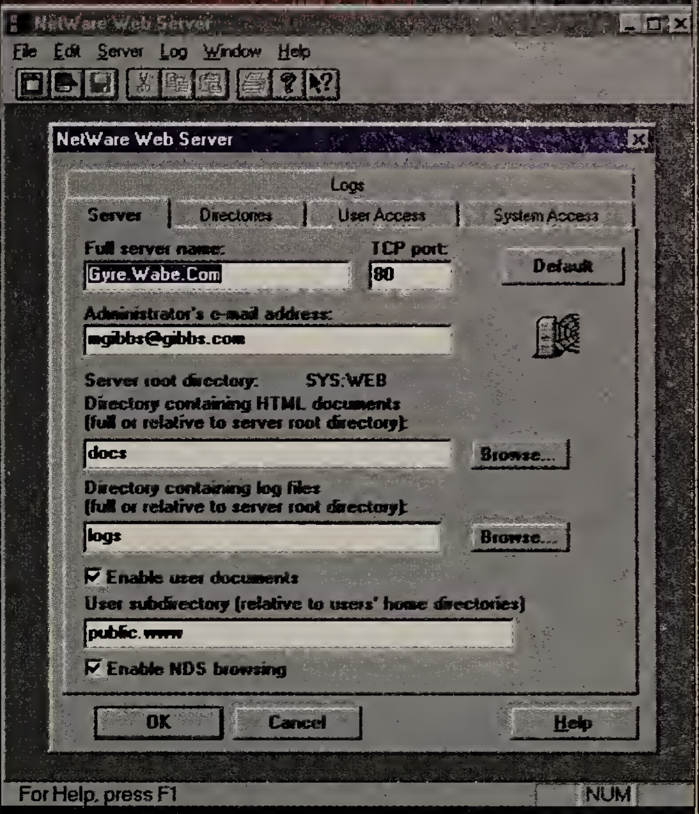
These virtual subdirectories are identified as the user's name prefaced by a tilde. Thus, if the standard name for a user Web document directory is webdocs and the home directory for mgibbs is sys:\users\mgibbs then the URL http://gyre.wabe.com/s ~mgibbs will really map to sys:\users\mgibbs\webdocs.

Options for activity monitoring include how log files will be handled, wether detailed debugging information will be recorded, and how large the files can be.

While the Webmgr utility can be used to view the different log files, no analysis tool is avail-

See Review, *page 18*

STAR WEB INTERFACE Cuadra



Full server name: Gyre.Wabe.Com
TCP port: 80
Administrator's e-mail address: mgibbs@gibbs.com
Server root directory: SYS:WEB
Directory containing HTML documents (full or relative to server root directory): docs
Directory containing log files (full or relative to server root directory): logs
☑ Enable user documents
User subdirectory (relative to users' home directories): public.www
☑ Enable NDS browsing

Cuadra's Star data retrieval tools are accessible by a standard browser, with help of a new gateway.

PROS AND CONS Novell's NetWare Web Server

Pros	Cons
Offers outstanding performance	Comes with poor documentation
Is easy to install and manage	Weak installation utility
Extends the NetWare server environment with PERL and BASIC programming	Doesn't have demonstration back-end applications
Provides support for local and remote CGI connections	

RATING

Value for money	4
Intranet usefulness	4
Quality	3
Overall	**4**

1 is poor and 5 is excellent

SUMMARY: Novell's NetWare Web Server, a solid, high-performance product, is a natural fit for sites with an existing NetWare investment. With the inclusion of a NetWare Runtime 4.1, the server also can be cost-effectively used by non-NetWare sites.

NetWare Web Server converts a 4.1 server into a platform for publishing HTML pages.

Check out the results of Web server performance benchmarking at http://iamg.novell.com/iamg/internet/shiloh/shiloh.htm.

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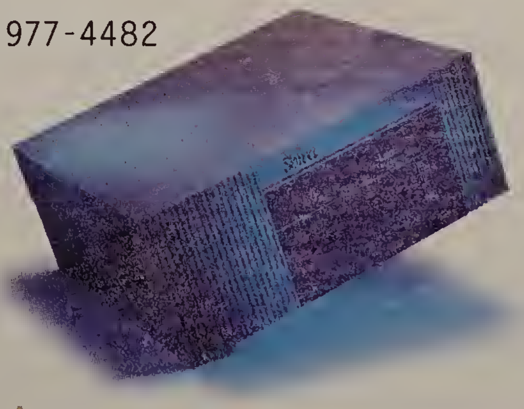

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Circle Reader Service **#39**

Review, *continued from page 15*

able that makes the log contents understandable. To make sense of the access log, which is in the standard NCSA format, look for one of the many freeware or shareware utilities out on the Internet or buy professional tools such as Interse Corp.'s MarketFocus.

User access control also is managed through Webmgr. You can set access control for documents, images, image maps and server side "includes" (embedded commands that add data as documents are retrieved) as well as any subdirectory under the document root. You also can specify access to directories by the browser's IP address or the network's domain name, if reverse domain name lookup is available.

Users can be authenticated through NDS. This means you need to create user accounts for each user to be authorized. The alternative is to specify authorized users in text files.

At your service

For an intranet Web server to be effective, it is important that it do more than simply hand documents to Web clients. It has to allow the data from browsers to be manipulated and stored on the Web server, and allow for documents to be created on the fly from a wide range of data sources.

Toward this end, the NetWare Web Server provides Server Side Includes (SSI). Web documents are written in HTML. SSIs are special HTML tags that are replaced on the fly by the Web server as the document containing them is passed to the browser.

The replacement data might be as simple as the date, time or a file size, or as complex as the contents of another file or the results of a calculation.

But serious business use requires programming, so the NetWare Web Server system comes with PERL and BASIC interpreters. These are standard implementations of the languages and, while they work for basic scripting purposes, do not support access to NetWare system functions.

The standard mechanism for back-end services to be run by Web servers is called the Common Gateway Interface (CGI). However, as NetWare isn't based on Unix or other "standard" operating system, Novell chose a different path.

NetWare Web Server offers two versions of CGI: Local CGI (LCGI) for interfacing applications that will run on the same machine that hosts the Web server, and Remote CGI (RCGI), where the application is to run on a different machine.

LCGI requires that you build your application as an NLM. This is not an inconsiderable task. However, the benefit lies in performance.

Conceptually, LCGI is similar to Netscape's NSAPI or Microsoft's ISAPI, both of which turn backend applications into shared Dynamic Link Libraries. LCGI does much the same thing using NLMs (which are also dynamically linked) and, once invoked, the process stays resident until the server exits.

LCGI applications tend to be very fast because the NetWare environment is non-preemptive and a competent applications design can effectively optimize code performance.

Novell also recognizes that for many organizations, other platforms are available that may be better for specific purposes. RCGI takes account of this by allowing the back-end application to be invoked anywhere on the network — including on the same machine — through socket connections.

Novell also provides a number of RCGI programs for different Unix implementations so that the RCGI connection actually appears to be a standard CGI. This allows existing backend applications that expect standard CGI to be used with the NetWare Web Server.

With the 2.5 release also comes Netscape Navigator 2.01, in both 16- and 32-bit versions, and Netscape's JavaScript documentation.

Novell claims it supports Java applets. That is misleading, as it simply provides a demonstration based on the widely available Animator applet. To run the demonstration or any other applets, you'll need to add extended name space support to the volume that has the Web server root document directory. Java naming conventions require support for long names.

NetWare Web Server does rate a few cons, but the pros more than tip the balance. This is a fast, well-implemented and robust product. ⊜

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*Computer Security Institute, November 1995 Survey
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INTRAVIEW

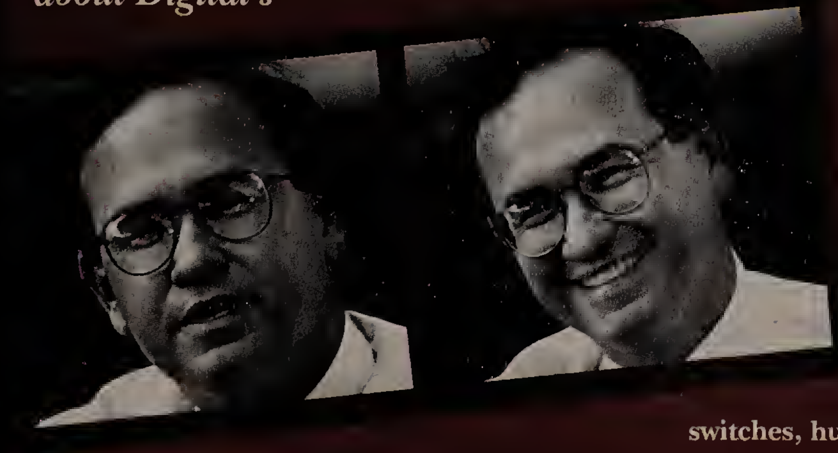
Q&A

A distinctly Digital view

Like quarterbacks, Web browsers and servers get all the glory.

But it takes more than a graphical interface and some HTML pages to make an intranet, as William Hawe knows. Hawe is the technical director and top strategist for Digital Equipment Corp.'s Network Product Business unit, which has pulled together everything from servers and software, management tools, network hardware, and integration and management services to help customers build intranets.

Hawe, an engineer by trade, helped bring the original Ethernet to market and holds 25 patents in network and encryption technologies. He spoke with Editor in Chief John Gallant about Digital's intranet strategy, its relationship with Microsoft Corp. and how the AltaVista search technology is helping the company drive into new markets.



William Hawe, technical director for Digital Equipment Corp.'s Network Product Business Unit.

Digital has long been a supplier of key intranet components, yet you are best known for a pretty recent development, the AltaVista search engine. Is that frustrating?

Yes, but it's great for the world to recognize that AltaVista is the premiere search and indexing technology. AltaVista works because of clever software for crawling, indexing and search/retrieval, the world's fastest computers, and our network infrastructure products like the Gigaswitch. It's fun to see all three come together in a fashion that is useful and underscores our leadership in Internet technologies.

It's ironic that infrastructure vendors such as Digital and Cisco Systems, Inc. provide the underpinnings for intranets, yet they aren't viewed as Internet players in the same way that Microsoft and Netscape are. Do you worry about that? Clearly, you have competitors who do, like Cabletron Systems, Inc., which claims to be *the* intranet company.

I don't think Cabletron is *the* intranet company. To be *the* intranet company one needs more than they can provide. [We] bring to customers and channel partners world-class products and services in everything required for the intranet. This includes the Gigaswitch, our network switches, hubs, routers, our NT and Unix servers, our service and systems integration, and our experience.

We were the first computer company connected to the Internet, when it was still the ARPANet back in the early 1970s. We were the first company with a public Web server on the Internet. We were the first to register an Internet domain. We were the first with a 10M bit/sec link to the Internet. We've had the largest FTP site. We generate and consume more Internet traffic than anyone. We had the first Internet firewall. We even shipped the first print server in the industry that had Internet technologies built-in.

It's well known that we work with Netscape [Communications Corp.] and Microsoft [Corp.]. They have each established mind share in this space, some of which derives from the fact that they focus on end-user software, which is more visible. We started our Internet Software Business in that area, and AltaVista is getting great recognition. Other parts of our product line are perhaps less visible since they involve the network infrastructure. Nevertheless, they are just as critical for building the complete solution.

What are Digital's strengths and weaknesses as an Internet/intranet company? Be candid.

Our strengths come from the fact that we probably have more, and broader, experience with the Internet and its technologies than anyone. We have participated in all aspects of this market, from the network infrastructure through servers and applications, such as AltaVista.

Our culture allows this experience to cross-fertilize each of our product and service areas. For example, AltaVista was developed in the same laboratory that developed the industry's fastest IP switch, our Gigaswitch/IP.

A weakness we have relates to a comment you made earlier about visibility. Since we have not traditionally been involved in end-user soft-

See Digital, *page 22*

> "Since we have not been involved in end-user software, we have gained less mind share with many users, even though they may be accessing our servers for information on the Web, or sending packets over our Gigaswitches at a network access point, or we may have designed their very network. We should be more aggressive in marketing ourselves in the Internet and intranet."

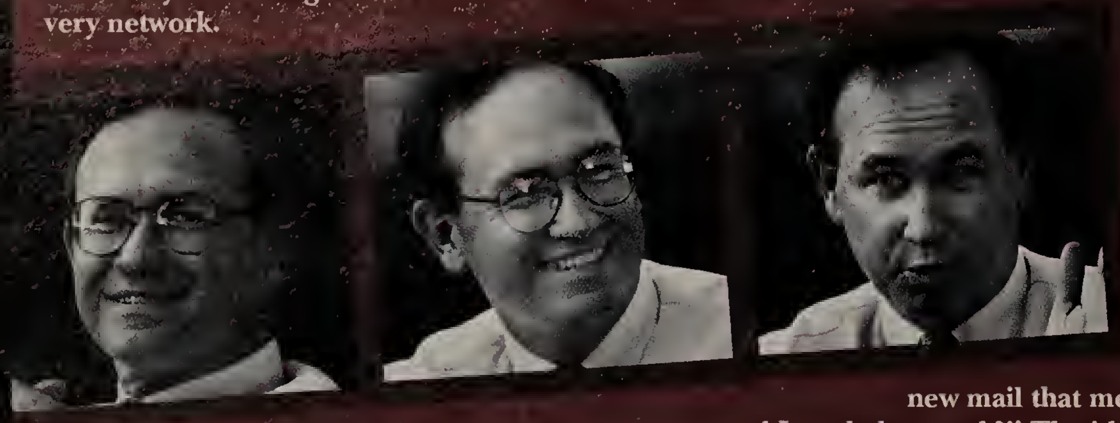
If the Internet were a tree, it would be a cross between a giant sequoia and a willow tree. Clearly, the giant sequoia because of its immense size and the thought one has when you see it that it really will grow to the sky. And the willow because, no matter what the storm, it bends and adapts and doesn't ever break. That's what you get as poetry from an engineer.

INTRAVIEW

Q&A

Digital, *continued from page 21*

ware, we have gained less mind share with many Internet users, even though they may, in fact, be accessing our servers for their information on the Web, or sending packets over our Gigaswitches as part of a network access point, or we may have designed and serviced their very network.



You are building a stronger presence in the high end of the server market with the Alpha-based machines. With all the hardware players bundling hardware and Web server software, what makes your particular Web server package more interesting?

It's one thing to sign an OEM contract for some Web server software. It's a completely different thing to have experience in deploying large-scale, high-bandwidth, production applications based on this technology. Once you've done that, you do the necessary engineering work in the base hardware and software to make sure the system is scalable and really works.

Let's switch to AltaVista. What 's your vision for search engines and the intranet?

The technology inherent in AltaVista will be of great use to people at the scale of the Internet, the corporate intranet, the workgroup and even at the personal level. We are developing a series of products targeting each. Since we have been using the Web technology for so long as a means for accessing both native Web data and legacy data, we have seen opportunities for automatic indexing and searching of all sorts of data types, not just Web data.

The Web is used as a ubiquitous user interface for new data and for legacy data that is made available through a variety of scripting and programming approaches. This quickly gets out of hand as people find it impossible to locate data. AltaVista will solve that problem and its feature set will expand to allow richer indexing and query methodologies.

Imagine automatic indexing and retrieval of data for mail, for your documents, for active software objects, even for network management elements in a [management information base] in an IP switch.

How do you see a search engine such as AltaVista making it easier to support collaborative computing applications on an intranet?

Let's take an example each of us is all too familiar with — our mail. We know we have received or sent something but we just can't remember where it is now, or what the specific handles are to retrieve it. Storage is such that very large volumes of mail can be stored on your disk for not much cost. That is, there is not much cost for the disk itself, but a large cost for the management and personal headache of finding things.

Imagine that all your mail is automatically and completely indexed the way AltaVista does this for the Web. This is more powerful than simple folders and folder searching.

Imagine the power if you could ask your personal AltaVista assistant something like "Do I have any new mail that mentions the proposal I made last week?" The idea is to give people and workgroups a tool set that allows them to index everything, along with methods to export legacy data into the system.

Over time, it seems more and more of the search functionality will be built into other products, such as operating systems.

It's clear that the way to make a business out of this is to stay ahead of the competition. We have developed what is clearly the industry's leading indexing and searching technology. We make a business out of that by not sitting back and admiring it. Instead, we take that technology and bring it to market with OEMs. We expand it and make it usable by workgroups.

FIND IT ON FUSION

Network World Fusion http://www.nwfusion.com

This is an edited version of our interview with Digital's William Hawe.

Find the full transcript of the Q&A on Network World Fusion (http://www.nwfusion.com). Click on Intranets.

Let's talk about your relationship with Microsoft. Can you outline the key pieces of that as it benefits an intranet user?

Several years ago, we began our partnership on NT with our Alpha/NT initiative. At the time, some people thought this was premature or just didn't understand it since NT was embryonic. Now it's clear to everyone that this was the right thing to do.

The Digital/Microsoft Alliance is aimed at customers in midsize and large companies who are striving to combine aspects of client/server technology with the higher level of service and support required in complex, organizationwide solutions. Intranet customers have additional requirements to implement solutions of potentially large scale, that involve network infrastructure optimized for this purpose, and require highly responsive service, support and systems integration. We bring the systems, servers, network components, and multivendor design, integration and service aspects for the complete enterprise to the Microsoft environment.

You've long been a player in the TCP/IP market and TCP/IP is at the heart of the intranet effort. But is it really the best protocol for supporting the multimedia applications we'll be building in our future intranets?

TCP/IP has proven to be remarkably robust and resilient. For example, when the industry moved to higher speed networks — 100M bit/sec and up — we enhanced TCP with larger window sizes to achieve higher throughput.

We will see some additional enhancement of each protocol — IP and TCP — to better support the applications you mention. It's not that you can't do, say, videoconferencing over TCP/IP. We have built products that do that and they work well. But as we gain more experience with these applications, we are going to enhance the protocol. We'll see that rather than a completely new end-to-end solution.

Debunk some of the myths the media is generating about intranets.

One myth is that the Internet and its technologies aren't suitable for bet-your-business operations. We've designed banking networks, stock trading networks, corporate networks, etc., with this technology and it works.

Another myth is that the Web is the intranet and the intranet is the Web. People focus almost exclusively on World-Wide Web technologies when they speak of intranets. There is more to an intranet than just the Web. It includes routing, IP switching and all the elements of the intranet infrastructure — the plumbing, so to speak.

What are some of the critical issues in managing intranets?

One increasingly important and difficult issue for people is managing data in the intranet. Currently, storage technology is on a more aggressive improvement curve than either processing or communications. Disks are getting larger at a rate greater than the rate at which computers or networks are getting faster.

Since the structure of a distributed network computing system is based on economics, we see several notable changes taking place. One is that very large amounts of data are being stored — everywhere. So we are seeing both large volumes of data and data replication.

We are also seeing the network traffic characteristics change as people move large volumes of storage. This means we want both switches in the network that can handle this traffic automatically, such as IP switches, and management tools that allow us to re-optimize the configuration based on traffic monitoring. ≡

Webifying Corporate Data

BY PEGGY WATT

Not even spiders on steroids could weave such a Web as is springing up almost spontaneously in corporations. That's great, but with internal Webs linking disparate systems, databases and resources, some intranet administrators and their charges are faced with information overload.

Much product activity of late has been focused on ways to help users deal with the volume of data turned up by their browsers. This means the desktop is still under construction by vendors and IS managers crafting corporate Web strategies.

The browser "is the fastest growing application on the PC today," says Microsoft Corp. Chairman Bill Gates. Microsoft (microsoft.com) recently held a briefing to tout its intranet product entries, notably the Internet Explorer 3.0 browser, which is in beta test this summer and set for imminent release. Gates says Internet Explorer 3.0 will be bundled with all Windows 95 shipments.

Internet Explorer 3.0 supports Microsoft's ActiveX object technology and the Java programming language. But, as usual, Microsoft has left some holes for creative third-party vendors to plug. In at least one case, the software giant is even making sure those plugs get built.

Microsoft has signed a licensing deal with NCompass Labs, Inc. (ncompasslabs.com) for ActiveX technology. NCompass Labs offers a beta version of ActiveX Plug-in Pro, an add-on for Netscape Communications Corp.'s Navigator browser, for downloading from its Web site. The add-on lets Navigator users see multimedia and "active page" functions on Web sites that use ActiveX technology, which is based on Microsoft's OLE controls. Pricing will be announced upon the product's release this month.

The NCompass Labs agreement unveils Microsoft's interest in making certain that ActiveX's acceptance is not stalled by the lack of Navigator support. Netscape has not endorsed or licensed ActiveX for use in Navigator.

Another new utility, Folio Web Retriever 2.0 from Folio Corp. (folio.com), crosses browser boundaries. It gives any Windows-based browser offline retrieval functions.

Web Retriever 2.0 downloads designated Web information into a free-form text database program called Folio Views infobase. Users can search and access the Web information offline using the infobase viewer. The advantage of the Folio Views format is that the downloaded data is compressed, but is indexed for fast retrieval.

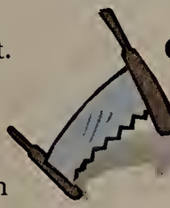
"Users can highlight or underline text, even write in the margins, and then send the view to a coworker or group of coworkers," says Michael Smith, a Folio product marketing manager. The views preserve the HTML format in the infobase's table of contents, so they record as hits in a browser-based query, Smith says.

As they can with other offline browsers, Web Retriever users can designate URLs to monitor and set automatic logon times.

Web Retriever 2.0 can be downloaded from Folio's Web site. It is priced at $39.99, and runs on the Windows family. The Views InfoBase Manager costs $295, and the full Folio Views Professional Infobase Development Kit costs $3,995.

Cuadra Associates, Inc. (cuadra.com) also is linking its existing information retrieval and management software to the Web. It offers the Star Web Interface, which provides a Common Gateway Interface (CGI) link between any standard Web server and Cuadra's Star information management software. The Star search-and-retrieval software manages most database information, including text and images.

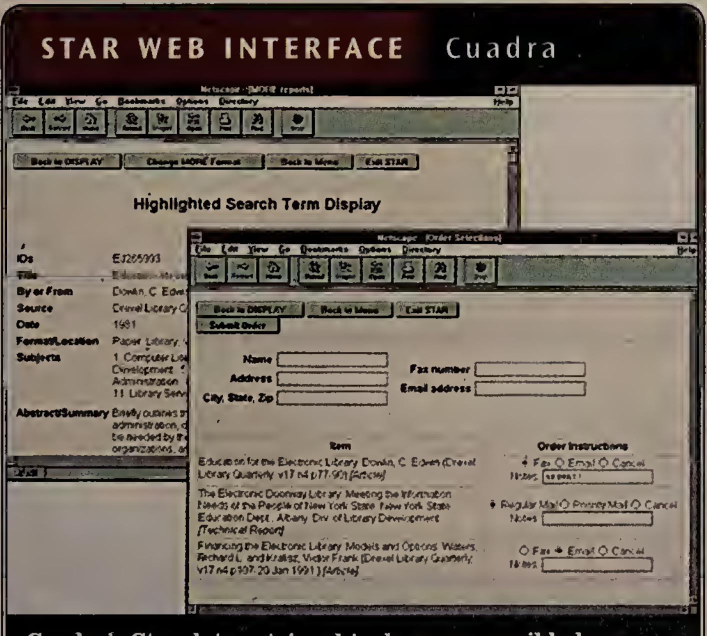
The addition of the Star Web Interface lets users conduct Star searches of a database through the browser/Web server configuration, instead of interacting directly with the search engine. The Star Web Interface allows point-and-click retrieval commands, shows indexes to help with searches and provides a charted display of linked files as part of the search results. Star Web Interface typically costs $240 per user, Cuadra says.



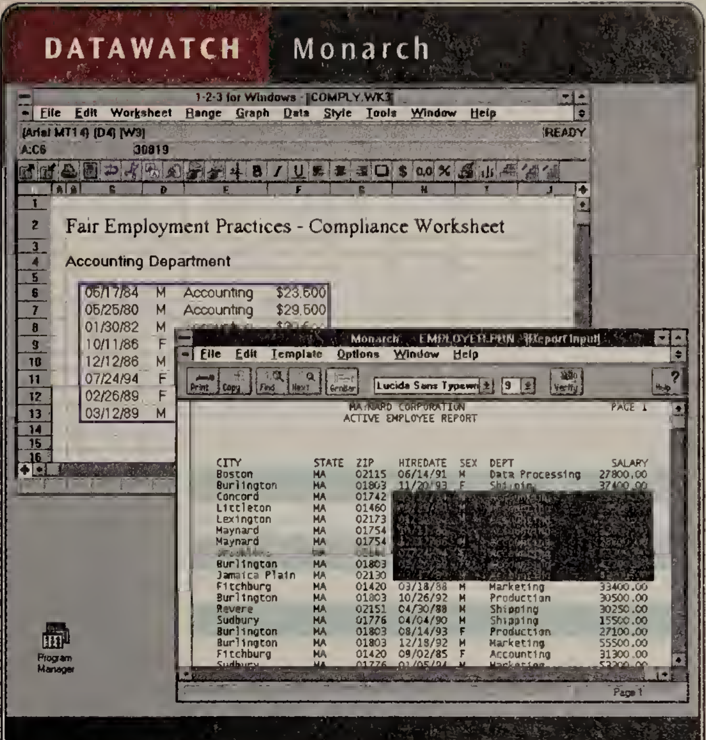
Collaboration Tools

Pundits who predicted the death of groupware at the hand of intranets may have overlooked the obvious: a partnership between the two.

Appearing rapidly and profusely are Webified versions of existing application suites. At the least, groupware is supporting gateways to Web servers. Collaborative applications are embracing the so-called enemy. Perhaps it's not a battle but a technology teaming.



Cuadra's Star data retrieval tools are accessible by a standard browser, with help of a new gateway.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Monarch - EMPLOYEE.PRN - [Report Input]
File Edit Template Options Window Help
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Help
Page 1
Program Manager

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06/17/84 M Accounting $23,600
05/25/80 M Accounting $29,500
01/30/82 M
10/11/86 F
12/12/86 M
07/24/94 F
02/26/89 F
03/12/89 M

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                 MAYNARD CORPORATION                        PAGE 1
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Maynard       MA     01754
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Burlington    MA     01803  10/26/92  M    Production        30500.00
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Datawatch's Monarch report manager converts legacy data into a graphical desktop format.

Best-prepared are the groupware programs that already support TCP/IP, because adding a Web server to such a collaborative environment may easily enhance its functions, not rival it.

For example, Attachmate Corp. (attachmate.com) has expanded its OpenMind groupware application suite to let users share and link documents across the Web and with existing electronic mail systems.

OpenMind 3.0, scheduled to ship this summer, will be Webified, thanks to an add-on module called OpenMind Web. The module gives any browser access to OpenMind's collaborative applications, even across an intranet or the Internet. System managers can set user access individually or by a group of logon extensions, so an entire department or partner company can easily get access to appropriate OpenMind files.

OpenMind's basic modules handle document management, Internet chat-style threaded discussions and Web access. Users can view and edit documents with their choice of word processors, because the program has more than 150 file viewers for different formats, says Susan Harman, a product manager at the company. Users also can track documents and selectively share them with others on the network.

The update supports replication, so companies can use several servers and scale OpenMind as needed. OpenMind 3.0 includes the Verity, Inc. search engine, which can index all E-mail and documents accessible through OpenMind; and the Emissary browser, which Attachmate acquired earlier this year.

Although including Emissary, OpenMind works with other browsers as well. The update also supports Microsoft's Messaging Application Programming Interface and can act as a client to Microsoft Exchange Server through new NetNews and E-mail modules.

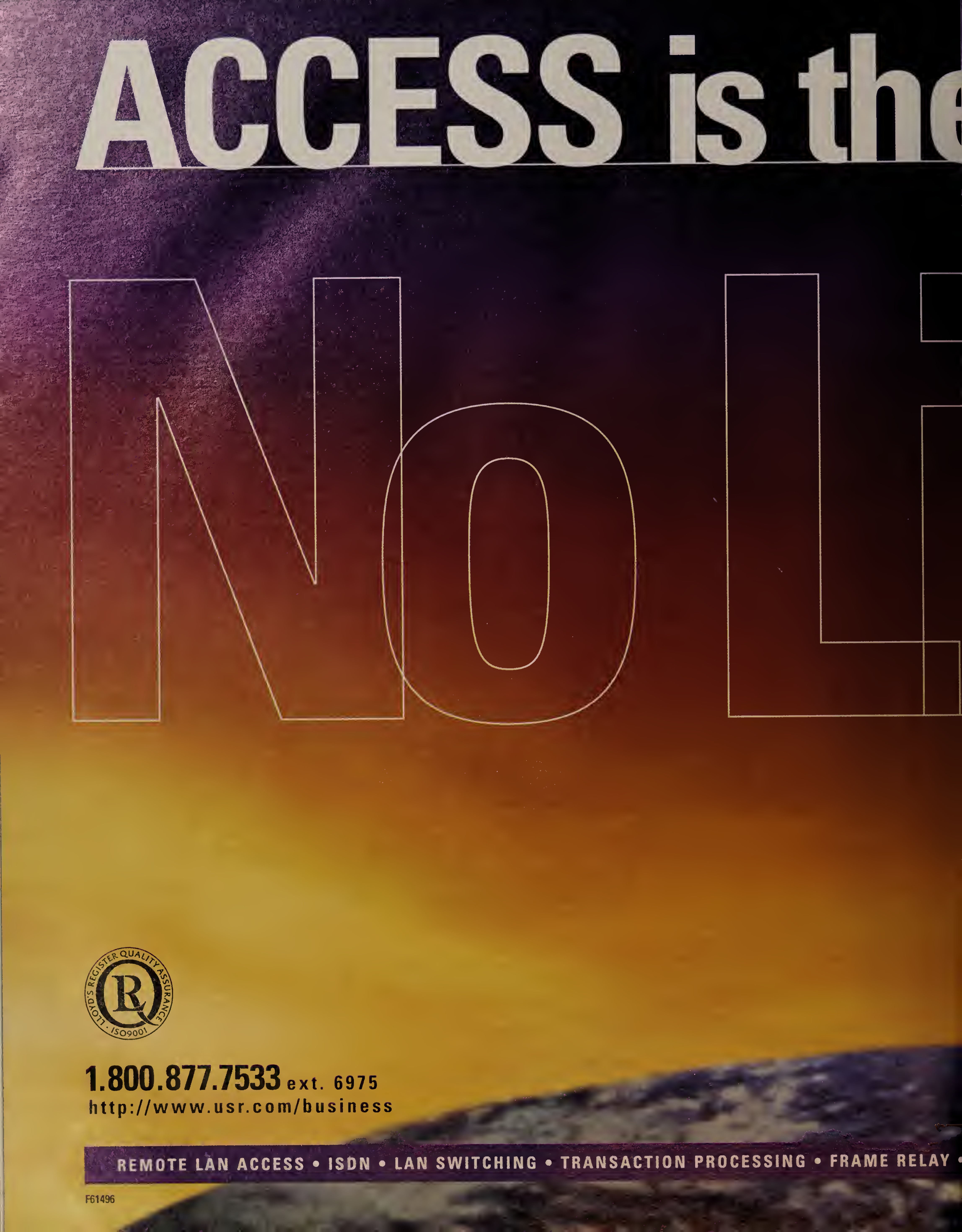
OpenMind 3.0 Server and support for five clients is available in prerelease form free on Attachmate's Web site; pricing for the commercial release is $75 for OpenMind Server, $50 per client and $495 for the E-mail and NetNews modules.

Also Webifying an existing application is Datawatch Corp. (datawatch.com), which expects to ship next month an Internet-

See Product Watch, *page 26*

Intranet technology is a world of nearly continuous beta software, says Russell Lipton, an analyst with Meta Group, Inc.

Encrypting intranet data transmissions may create more secure traffic than many companies' current client/server setups.



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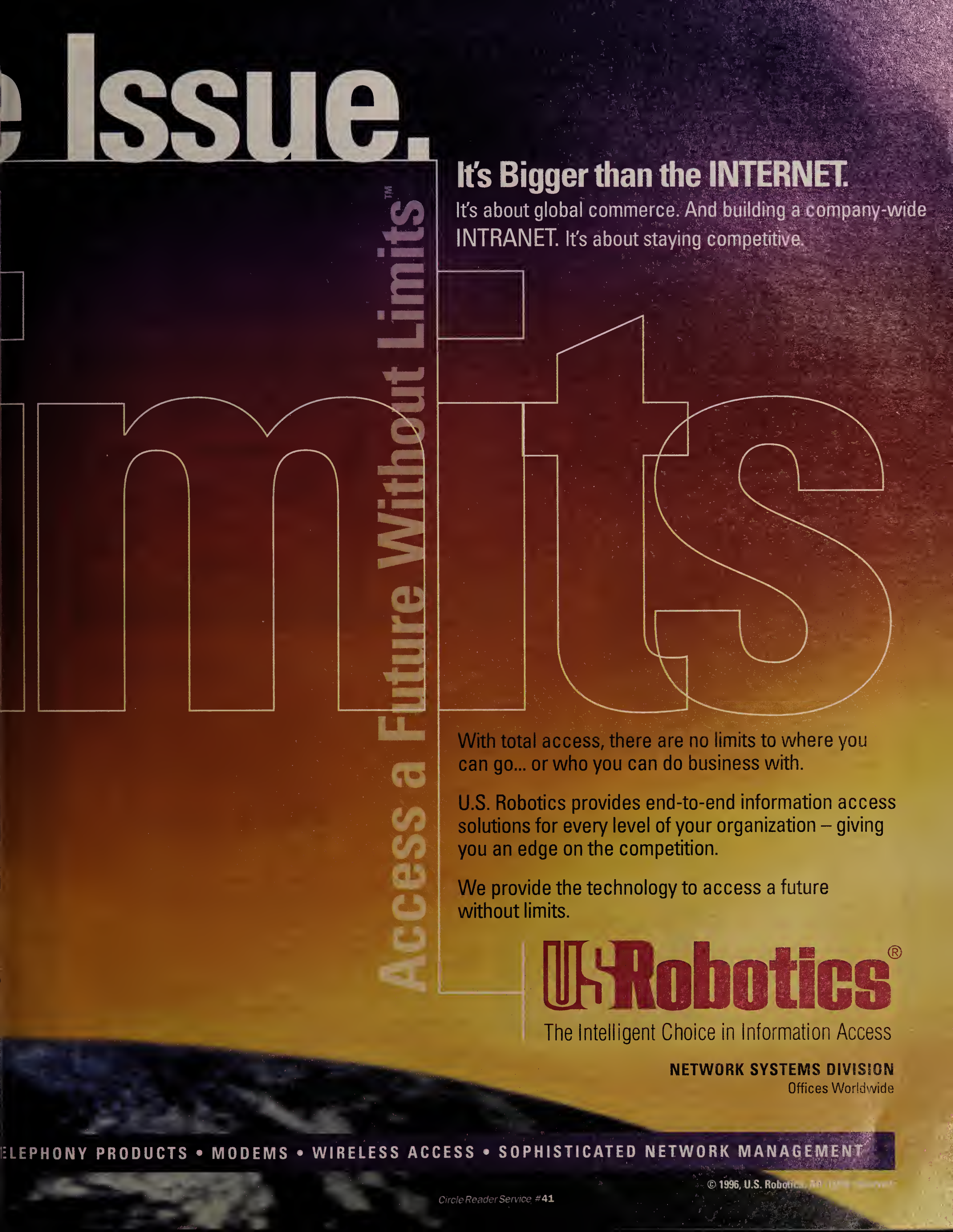
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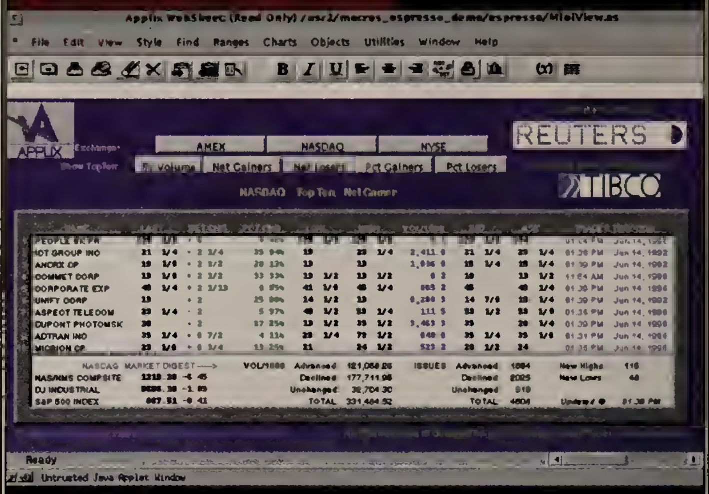
Web browsers efficiently open and leverage data warehouse investments, making them more visible and usable.

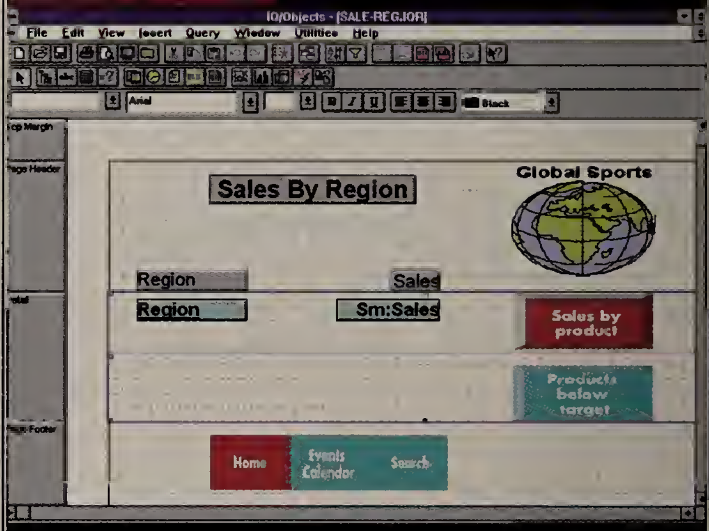
Data warehouse and data mining vendors are scrambling to ensure browser access to data in the Webified workplace.

ANYWARE WEBSHEET Applix



Applix's Anyware suite of Java applications retrieves online data and the appropriate applet via a browser.

IQ/LIVE WEB IQ Software



IQ Software's IQ/Live Web middleware lets users retrieve legacy data and display it as HTML graphics.

Product Watch, *continued from page 23*

oriented version of its reporting products.

The Monarch report management system converts legacy reports into a desktop format for users to view, search and edit data. The new Monarch Version 3.0 generates a Portable Report Format (PRF) that compresses report data for electronic distribution. Users also can password-protect a PRF file for transmission.

Typically, a PRF file viewer sits on a Web or E-mail server for shared use, and decompresses a PRF file when a user retrieves it. Datawatch will market both a stand-alone viewer, called Monarch Report Explorer, and a plug-in version for Netscape's Navigator browser.

The PRF technology is akin to Adobe Systems, Inc.'s portable document format (PDF), says Marco Peterson, Datawatch's vice president of marketing and product development. "Like a PDF file encapsulates information to represent a document, a PRF file can let users filter and analyze report data," he says.

Several Monarch accessories under development for release later this year give users more options for report data management, Peterson says. For example, PRF Page Server retrieves data a little at a time, so users can request reports page by page. PRF Builder generates PRF documents on the fly, using templates, in batch-processing style. A Report Warehouse can match reports with formatting instructions and store them together for later retrieval.

The Monarch 3.0 family is available in beta-test version for free downloads from Datawatch's Web site. Pricing will be $499 for Monarch 3.0, and $49 for the Explorer stand-alone or plug-in versions, which will be available in both 16- and 32-bit implementations, the company says.

Applix, Inc. has applied its real-time decision-support software to the Web. It has crafted a family of Java-enabled applications that exemplify the intranet model of splitting processing between the client and server.

Applix has posted for online trial its collection of Java applets (applix.com/espresso), which include utilities such as a query tool called Anyware WebData and a spreadsheet called Anyware WebSheet. Users can access the tools with any Java-enabled Windows browser.

Just the Facts

WEBIFYING THE WORLD

International Data Corp. projects the intranet software market will hit about 10.5 million units this year. That breaks down roughly to:

- **214,000 Web servers**
- **42,000 firewalls**
- **7 million browsers**
- **750,000 authoring tools**
- **2.4 million E-mail applications**
- **190,000 other applications**

The applications run on and are managed by the Applix Anyware Server, which publishes content and interactive applications on Java-enabled platforms. The user connects to the Applix HTTP server and launches the Applix Anyware client, which is a Java applet.

"It looks and feels like a local application, but the processing occurs on the server," says Anthony Giannelli, an Applix vice president.

The system also requires the Anyware WebRealTime Gateway license for each user, and an Anyware WebData Gateway License to each SQL database accessed through the server.

But users can't save or store information at the client, which is actually a limitation of the current implementation of Java, says Barry Burke, director of product planning and management at Applix. However, that practice maintains security at the server level, as well as forces compliance with any security built into the databases accessed.

"We could do these light client products as Navigator plug-ins and as ActiveX applications, but that doesn't address MIS concerns about desktop residence," Burke says. Storing the applications on the server makes maintenance, upgrades and even security easier.

Applix will ship its Anyware family on SunSoft's Solaris operating system in the third quarter. The Anyware Web Server will be priced at $4,995; the client software is priced per concurrent user. The basic client component costs $99 per concurrent user; WebSheet, WebData Gateway and WebRealTime Gateway cost $295, $195 and $995, respectively. Anyware Innovators Workbench, a graphical development environment, costs $2,495.

Web servers

Intranet technology is building a new route to the data warehouse. Through middleware, translation or software detours, vendors of legacy data systems are eager to Webify. Most vendors are browser-agnostic.

Among the earliest entrants is Information Advantage, Inc. (infoadvan.com), which is shipping WebOLAP Server as part of its DecisionSuite product suite. WebOLAP gives users access to online analytical processing (OLAP) operations over the Web, from any browser.

WebOLAP is particularly effective for broadcasting search results to a number of users. Reports can be live, and remain connected to the legacy data, so users can add to or edit the reports before passing them along.

The initial release is for Hewlett-Packard Co.'s HP-UX systems. WebOLAP Server is being marketed as part of HP's OpenWarehouse Web Initiative, which includes HP hardware and products from both Information Advantage and middleware developer Red Brick Systems, Inc. Pricing begins at $75,000 for four concurrent users.

IQ Software Corp. (iqsc.com) is shipping a Web middleware product designed to publish information from corporate databases on Web servers.

The product, called IQ/Live Web, is built on IQ's existing technology and works with IQ/Smart Server. The server executes any query that arrives via an inquisitive browser, and IQ/Live Web puts the response in HTML format onto a Web page, says Michael Gaiss, director of marketing programs for IQ Software.

The tools give database managers several customization options. For example, the software can be set to regularly retrieve legacy information and post updates to a Web page. Also, managers can write CGI scripts for common queries, so users can simply choose from a menu.

A related tool, called IQ/CyberLinks, lets users build hyperlinks and navigate among diverse data sources, such as online resources, existing databases and documents created as IQ/Objects, which are live reports generated by IQ/Smart Server.

"Many of our customers are building intranets as a common communications platform, and then extending it to decision support," Gaiss says.

IQ/Live Web is marketed as a package with IQ/Smart Server, IQ/Objects and IQ/CyberLinks, starting at $3,995 on Windows NT and low-end Unix but available on a number of Unix platforms. IQ/CyberLinks is marketed as a $99 add-on to IQ/Objects.

IQ Software competitor Business Objects, Inc. (busobj.com) is taking a broader approach. It plans to Web-enable its entire query, reporting and OLAP suite.

BusinessObjects 4.0, scheduled to ship this summer, will add Web-friendly features such as support for HTML reports, automatic posting to Web sites and support for embedded hyperlinks to BusinessObjects documents. The new version will extend existing security functions to Web page interaction.

"Browser access is the first phase, which lets users create and store canned reports for download through a Web site," says Fred Wee, product manager at Business Objects. Next, Business Objects will support ad hoc queries, he says.

Prerelease versions of BusinessObjects 4.0 are available from the company's Web site. Pricing will be announced upon release.

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With employees flocking to put information on the corporate Web, companies find themselves devising policies aimed in part at keeping merriment to a minimum.

Using policies to tend the wild & woolly intranet

BY ELISABETH HORWITT

Thinking about letting your intranet run free as a little experiment in self-management?

Think again. Intranet pioneers are learning that carefree publishing policies can be bad business.

You don't have to look further than the public Web for evidence, says Richard Finkelstein, president of Performance Computing, Inc., a Chicago-based consulting firm.

One of the problems with the Web is there is no central authority to review information for quality and freshness, Finkelstein says. So it's up to end users to check a source's bona fides – if they can. (Didn't know that hospital procedures now dictate that the baby should NOT be thrown out with the bathwater? Sorry, Miss Ratchet, should have checked to see if you were reading the latest procedure manuals.)

Worse, the sheer volume of available data on the Web can make it next to impossible to locate particular pieces of information, Finkelstein notes. Do a general query on "intranet" with a powerful new search engine like Digital Equipment Corp.'s AltaVista (www.altavista.digital.com) and you get 20,000 possible links.

Corporations with no formal policy for monitoring and reviewing internal Web sites are in danger of having their intranets become equally as chaotic and difficult to navigate, Finkelstein says. "Just because HTML is simple to use doesn't mean everyone should do Web applications."

It's so easy to publish documents on a Web that some IT groups are deaf to the intranet explosion happening around them. Steven Telleen, director of Amdahl Corp.'s IntraNet Solutions Group in Sunnyvale, Calif., says he knows of some IT managers who set Web crawlers free on their nets and discovered twice as many internal Web servers than they knew about.

The enlightened have been keeping a watchful eye on early intranet installations and then implementing formal policies when growth escalates.

At Allied Signal Corp., for instance, internal Web sites have been proliferating for some months now. This rapid growth has prompted the company's IS council to think about formulating a Web authoring policy, says Chuck Necker, Webmaster at the Computing Technology Center for Allied Signal's central business services unit in Torrance, Calif.

But a sharp intranet growth curve is only one of the factors that causes IT executives to come up with formal Web authoring policies.

At J.P. Morgan & Company, Inc., IT began implementing Web authoring policies when departmental servers started being integrated into a more systematic information-sharing corporate intranet environment, says John Bullivant, vice president of Internet Services at the New York-based global financial services firm. About one year's time separated the advent of the grassroots departmental services from IT's decision that some degree of information quality control was warranted.

Walking a tightrope

A key issue with which corporate intranet policymakers are grappling is how to preserve the delicate balance between end-user publishing freedom and license. They don't want to discourage users from exploiting the intranet as a low-cost, easily accessible, system-independent medium for disseminating information. At the same time, however, upper management is increasingly concerned about the risks of unbridled information distribution internally, as well as externally, on the Web.

One issue before Allied Signal's IS council, for example, is whether to go on letting users put up Web sites without any formal oversight, Necker says.

The upside of a laissez-faire policy is that employees can get useful, timely information to their colleagues since they're not hampered by an overly restrictive or lengthy review process. The downside, however, is the "risk of sensitive material being made generally available without proper need-to-know criteria being applied," Necker says.

Furthermore, the council worries that unsupervised Web authors could put up nonbusiness-related, inappropriate material, such as profanity, Necker adds.

In fact, profanity is a minuscule piece of the multifaceted problem of intranet information quality control, user and analyst sources maintain. A much bigger issue, particularly as intranet installations reach into the tens or hundreds of servers, is separating the wheat from the chaff. Otherwise, the corporate Web could become just like its public counterpart: inundated by low-quality, extraneous and stale information that hinders users in their search for job-related material.

Officer friendly

While conceding the need to implement some level of quality control on authorship, some IT executives say they trust the vast majority of employees to use the intranet responsibly and productively. Indeed, corporate intranet policymakers represent themselves not as policemen guarding against abuse but as facilitators who help end users ensure that the information they put out on the Web is accurate, fresh, and easy to locate and understand.

Take Silicon Graphics, Inc. (SGI), which operates about 2,400 Web servers and has some 200,000 URLs on its intranet. IT, which actively encourages grassroots efforts, doesn't think there's much frivolity on its Web, massive as it is. "Most of the server content leverages an employee or department's productivity, or creates applications that save money or improve workflow," asserts Brett Monello, manager of corporate Web systems for SGI in Mountain View, Calif.

Of course, the crucial mission of information quality control may require quite a bit of intervention on IT's part. It often takes the form of multiple layers of reviewing, editing and technical assistance between what the end user produces and what actually goes up on a Web server.

The extent of that intervention varies a great deal, depending on corporate culture, organizational structure and the types of end users – and information – involved.

A helping hand

At J.P. Morgan, for example, intranet managers won't outright nix content. "It's unlikely we'd turn down anyone's request to put information out, but we may give advice on how to make it look better and on what is good and not good [publishing] practice," Bullivant says.

PHOTO BY EDWARD CALDWELL

"If you put up something that is not suitable for the [corporate] Web, you'll probably get flamed."

Brett Monello, SGI

The firm's Internet Services group, which monitors, manages and facilitates corporate Internet and intranet installations, does not prohibit anyone from putting up a Web site for sharing personal information or in-process, project-related data with colleagues, Bullivant says. However, a stringent, multilevel review process kicks in when a Web page or application is destined for production use.

First, the author must fill out an online registration form. A content link within the form indicates the Web site where the information resides. "That form is a way of alerting us that there is a new site we need to integrate," Bullivant says. "It triggers the whole process of looking at it, providing editorial help, putting in links to our 'What's New' home page."

Once the material is registered, a technical IS group reviews it to ensure conformance with corporate application implementation procedures and practices, Bullivant says. Those guidelines are the same whether an application is client/server-, Web- or mainframe-based, he notes.

See Policies, *page 30*

CAR POOLING INCREASES!
New Products Arrive!
STOCKS RISE!
ILLUSTRATION BY EDD PATTON

Policies, *continued from page 29*

The Internet Services group does not make unilateral decisions as to whether content is suitable, Bullivant emphasizes. "We leave it up to the professionalism [of J.P. Morgan employees]. Any site that puts up inappropriate information is likely to be short-lived because people won't look at it or use it," he says.

The Internet Services group facilitates this natural winnowing process by collecting statistics on how often a site is accessed and by whom, Bullivant says. "If something is not read for a couple of months, we might seriously advise people to radically change the content or do something fresh."

At SGI, Monello's group has published a detailed set of guidelines for setting up intranet pages. The guidelines, which Monello stresses are recommendations, not rules, cover topics such as file naming conventions, basic navigation tips and HTML tags.

To a large extent, SGI's intranet managers trust users to police the Web sites themselves, Monello says. "If you put up something that is not suitable for the [corporate] Web, you'll probably get flamed. If you put up a substandard site, or allow information to get obsolete, you get specific feedback from users who depend on your information," he explains.

Management even tolerates "personal expression home pages," as they help employees get to know one another and deepen a sense of corporate culture, Monello says. And rather than restrain users from turning their workstations into personal Web servers, SGI's network operations group figures out the optimal bandwidth for maintaining adequate throughput, he adds.

A Web council

Amdahl's Telleen defines a more formal intranet management organization for his own and other would-be intranet implementors in a white paper available on the Web (www.amdahl.com). He suggests review of information that is officially sanctioned and commissioned by the enterprise, in order to ensure that it meets corporate standards for accuracy, currency, confidentiality, liability and commitment.

At Amdahl, most lines of business, as well as areas such as human resources and accounting, have their own internal structures for reviewing Web page content. The publishing hierarchy comprises publishers, editors and authors, as well as the Web administrator and Web council.

Formal information is posted on official corporate Web servers that IT backs up and maintains, Telleen says.

And what of the Web sites and pages that somehow escape corporate scrutiny? "The best way I've seen to find Web servers you don't know about is to use Web spiders or crawlers that start with what they know, and follow the links," Telleen says. Such search tools are also the means by which IT and end users can locate less formal but work-related project or group information that may not be listed in enterprisewide directories, he adds.

Of course, if a Web page has no links to pages known by the crawler, the crawler won't see the page, Telleen adds. "But we're not concerned about that. If something is being used officially by the company, or by a widespread group of users, it's linked somewhere. If not, it's just personal information."

Amdahl makes no attempt to police personal pages for racial or gender-related slurs or other politically inappropriate material. However, Telleen says, if such material is discovered on a page, it would be treated just the same as offensive material found taped to an office wall. At that point, he says, "it's a management issue." ⊜

DOWN THE LINE

Amdahl's IntraNet Solutions Group recommends setting up a publishing hierarchy so that fresh, pertinent information goes out on the Web. Its intranet chain of command comprises:

- **A Web council** defines and refines corporate policies, guidelines and standards for Web publishing.
- **Publishers** determine what kinds of formal information a particular organization should create and maintain. They sit on the the Web council.
- **Editors** apply the publisher's ideas to specific information on a particular product line and manage the information creation, update and formal review processes.
- **Authors** create the actual content.
- **A Web administrator** chairs the Web council, facilitates cooperative opportunities and administers the enterprise content management infrastructure.

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See Network run. Run Net, run.

SunWeb lets staff fetch facts

BY PEGGY WATT

Sun Microsystems, Inc. and its live mascot — a dog named Network — take this loyalty thing seriously. Well, Network has to. After all, you don't bite the hand that feeds you.

But for Sun, loyalty simply means spending its cash on intranet technology like it urges its customers to spend theirs. This year marks the first that Sun will spend more on its information infrastructure than on its physical one.

Most of the information systems (IS) budget will be used to expand and support the company's evolving intranet. Sun's 16,000 employees in 44 countries have built more than 2,000 internal Web sites to manage development projects, people, equipment, cash flow and other daily business operations. William Raduchel, the company's chief information officer, estimates the number of Web pages at Sun has doubled every year to a quarter of a million pages today.

Every workstation inside Sun runs either the company's own HotJava or Netscape Communications Corp.'s Navigator browser under the Sun Solaris Unix operating system. Server software of choice includes Apache from the NCSA or the Communication and Commerce products from Netscape.

Sun officials credit all those internetworked Web pages with saving the company $25 million annually. Savings accrue from drastically reduced printing and document publishing costs and postage, among other things.

Immersed in culture

Listen to most Sun officials, and you'd think the intranet has been part of the company forever, even though the first Web pages didn't appear until about two years ago. Certainly, many intranet features – easy collaboration, ready access and a breadth of online resources – are characteristic of its corporate culture.

Ironically, legacy systems opened the intranet gates, says Raduchel. When Sun bought its mainframe in 1989, the IS staff decided to integrate it by running SNA over a standard TCP/IP network. So TCP/IP went in everywhere, preparing Sun for its eventual intranet.

Even back then, Sun had an electronic collaborative culture. "People would send E-mail rather than run to an office next door," says George Reyes, vice president and corporate controller at Sun, which is based in Mountain View, Calif. As a natural extension of that culture, Sun's

See SUN, *page 32*

PHOTO BY CINDY CHARLES

Sun HR director Patricia Baldwin and CIO Bill Raduchel peer in on Sun's canine mascot Network, who was picked to symbolize easy retrieval of information.

SUN, *continued from page 31*

internal Web pages went up within collaborative workgroups about two years ago, in the same grassroots manner experienced by companies around the globe. "It's been all bottom up," Raduchel says.

IT management stepped in about 18 months ago to actively plan and grow the intranet, called SunWeb, because Raduchel saw how the technology complements the corporate philosophy of collaboration and innovation. Recognizing Sun's stated commitment to bottom–up innovation, Raduchel won't dictate intranet policy.

"It's our role to provide the resources for people to generate new ideas," Raduchel says.

Toward that end, IS deploys the equipment needed to support creative internal Web endeavors. The department oversees development of some corporatewide tools that couldn't come from individual workgroups, and it continues to ensure all Sun employees have access to the innovations.

Today, SunWeb connects just about everything inside the company, linking even international sites via the existing backbone and the Internet. Employees access the backbone itself by nothing less than a 56K-byte leased line, and T-1 circuits cross the oceans to link international sites. Remote or traveling users also can dial in to the backbone.

SunWeb's contents grow daily, as any Sun employee or department can link a Web site to the main home page. Content ranges from corporate postings to sales material, product specifications and a multimedia corporate newsletter called WSUN Radio, which features The McNealy Report, hosted by CEO Scott McNealy.

"Our philosophy [in IT] is to architect and distribute," Raduchel says. "The job of top management is to lay out the infrastructure and the tools, and let people implement the solutions." Clearly, the intranet is rising at Sun.

Financial assistance

Sun's earliest official intranet applications were financial, and one that is being Webified now actually predates the impromptu, scattered Web servers built by software development teams. The programs range from the just-completed Finance Web pages that corporate officers tap for the latest financials, to the 3-year-old Sun Travel and Expense Accounting (SunTEA) system used by nearly everyone.

Although SunTEA is just now being converted to support HTML screens, Sun considers this Unix application an integral part of its intranet. The application — which was one of the early internal groupware applications to use wizards and automatic routing functions so users need only click a button to take the next step — is accessible via Web browsers.

Employees fill out their expense forms online and mail them to their managers, who send them electronically to accounting, says Reyes, the corporate controller.

SunTEA cost $1 million to implement in 1993, Sun officials say. It costs $400,000 a year to maintain, but saves an estimated $2 million annually compared to previous paper-oriented methods.

Finance Web, launched almost a year ago, relies heavily on Web technology. It is the source and workspace for the quarterly reports, projections and competitive analyses that Reyes prepares for corporate officers. The figures are current because they come directly from Sun's financial databases, which run on Oracle Corp.'s Oracle and Oracle Financials.

Sun programmers wrote custom code to manage data transfer and translation between the Oracle database and Web pages written in HTML.

PHOTO BY CINDY CHARLES

Baldwin and Raduchel check out one of Network's dog houses, which are erected at every major Sun site.

Users access Finance Web by the HotJava or Navigator browsers. They can retrieve and view cash flow statements, quarterly reports, head counts and extensive competitive analysis reports on Web pages.

The information is accessible in varying degrees to employees ranging from the rank and file to corporate officers. Sun deploys its own SunScreen firewall to secure the data from internal users

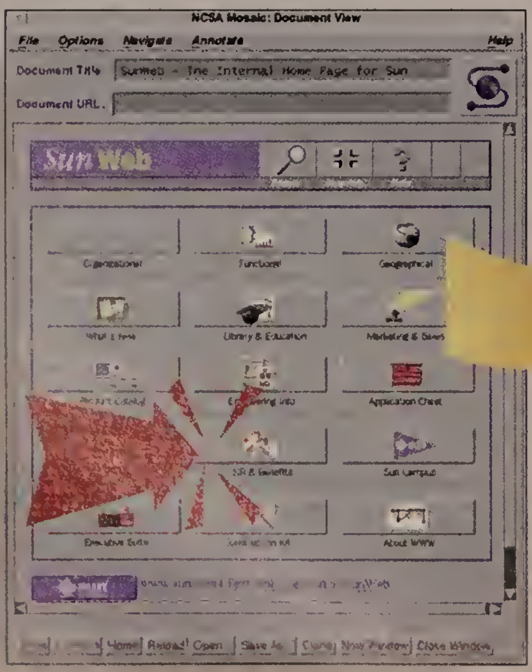
SITE SEEING

A step-by-step guide to Sun's intranet

Managing a job transfer

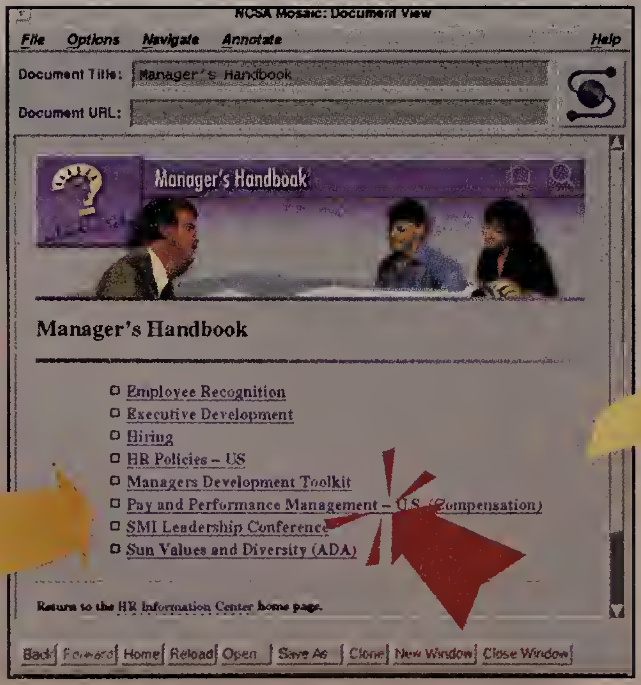
A manager at Sun Microsystems, Inc. is concerned about an employee's performance. The programmer isn't doing a bad job, but the fit doesn't seem right. The manager thinks a layoff would be too drastic, so she wonders if it's possible to transfer the employee to another department. She decides to check with human resources.

❶ Rather than picking up the phone as she would have done a year ago, the manager turns to her desktop computer and launches SunWeb, the corporate intranet. From the SunWeb home page, she can get to online Human Resources Department tools that help managers evaluate employees' work and determine the appropriate (and legal) course of action. She clicks the Human Resource and Benefits hot button and begins her search of the HR Information



Document Title: SunWeb - The Internal Home Page for Sun

Document URL:



Document Title: Manager's Handbook

Document URL:

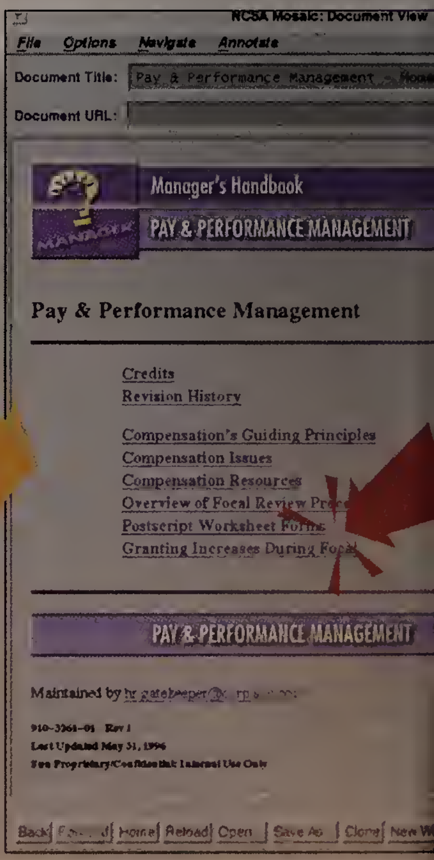
Manager's Handbook

- Employee Recognition
- Executive Development
- Hiring
- HR Policies – US
- Managers Development Toolkit
- Pay and Performance Management – U.S. (Compensation)
- SMI Leadership Conference
- Sun Values and Diversity (ADA)

Return to the HR Information Center home page.

❷ The manager figures that if she's going to propose a transfer, she better have all the salary information on hand for both the employee and her potential new boss. She chooses the Pay and Performance Management button to get some salary guidelines.

❸ SunWeb responds with a selection of resources regarding salary policies and employee evaluations. The manager in this case clicks on Postscript Worksheet Forms, which she can fill out online or print out since they are stored as Adobe Postscript files.



Document Title: Pay & Performance Management - Home

Document URL:

Pay & Performance Management

Credits
Revision History

Compensation's Guiding Principles
Compensation Issues
Compensation Resources
Overview of Focal Review Pr
Postscript Worksheet Forms
Granting Increases During Focal

Maintained by hr gatekeeper@

910-3361-01 Rev 1
Last Updated May 31, 1996
Sun Proprietary/Confidential: Internal Use Only

who do not have authorized views, as well as from external sources.

Little more than six months ago, everything was on paper, Reyes says. "I'm trying to eliminate as much of that stuff as possible," he adds. "You're never quite sure what it really costs."

But Sun's intranet will really earn its keep when Reyes can open it – selectively – to outsiders. The goal is to give top suppliers home pages on SunWeb. "We probably buy $3 billion in goods from suppliers, and I want to put all that online," Reyes says.

Each vendor's page will show records of order status and payment. The pages will draw up-to-date information by linking the Oracle database to other internal databases, such as inventory tracking and accounts payable. Suppliers and the Sun departments doing business with them will be able to check order status online.

Sun does about 20% of its outside business electronically now; Reyes wants to reach 80% within 18 months. He estimates the financial services group operates at about 30% of the intranet's potential productivity. But, he says, "Already, I can't imagine life without it."

Human resources

Personnel services are often among the first applications on a corporate intranet, but they can offer much more than simply an online version of the employee manual.

In 1994, Sun began building Compass, an online personnel services site accessible from SunWeb. It is going live a little at a time, with full deployment intended this fall.

Through Compass, Sun employees can check address and phone listings, manage their 401(K) plans and ESOPs, read corporate newsletters, order corporate clothing from the SunWear catalog and review or register for internal training from Sun University.

"We wanted to set up a system that worked the way people do business," says Patricia Baldwin, director of business simplification in Sun's human resources department. "We moved toward making everything simpler, and then automating it."

The Website provides electronic tools supervisors can use for people management. For example, a manager awarding a promotion or bonus can check an employee's salary history (drawn from a secure database and converted to HTML) and compare it to the range for similar staffers. The appropriate forms to process a status change are online, and wizards route them to the necessary recipients or department files.

Baldwin's group is especially pleased with last summer's success in automat-

See SUN, *page 34*

Sun spots its chance

Web proliferation mirrors net developer's goals.

To say that Web technology is a Sun Microsystems, Inc. priority is an understatement. Every company division, including SunSoft, Inc., Sun Microsystems Computer Corp., SunService and the recently formed JavaSoft, is focused on finding wealth in the Web.

For intranets, Sun's product lines span the needs of most installations. Its hardware foundation is a mature selection of SPARC-based servers and workstations, notably its Netra Internet Server family. Sun's Solaris Unix operating system is available for both SPARC and x86 systems.

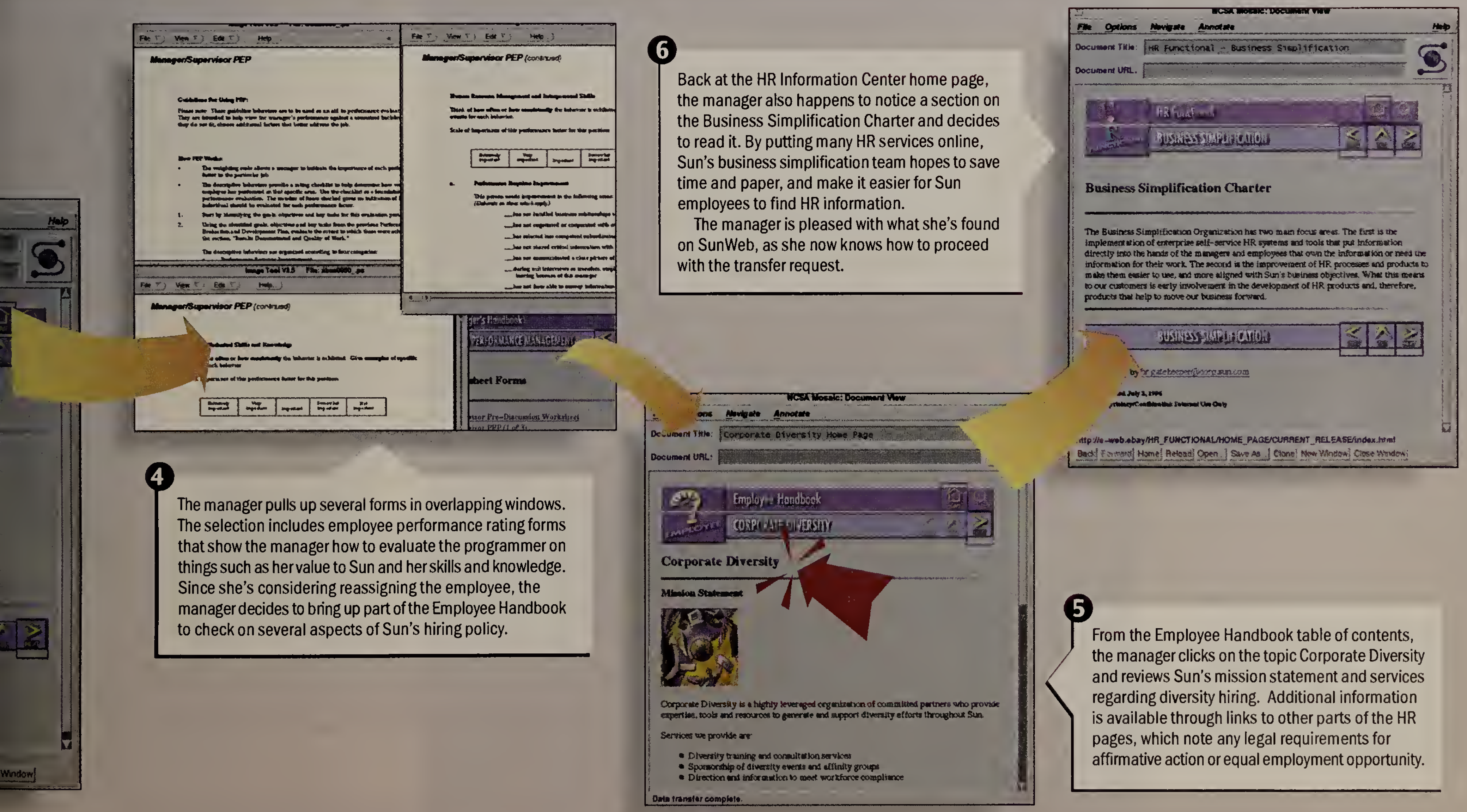
SunSoft recently enhanced its line with 'Net-oriented additions, such as the Solstice SunScreen firewall, and the JavaSoft division is brimming with Java enhancements. Sun also resells Netscape Communications Corp.'s Web server family.

Sun is committed heavily – and realistically – to services that may involve other vendors' systems. From SunIntegration Services, which assesses a customer's networking needs, to a new Internet Systems Management Services group, which helps IT bring order in companies with internal Webs popping up indiscriminately, Sun offers a selection of consulting services that include custom development and, perhaps, sales of more Sun systems.

But what does Sun reap from Java, since the company is essentially giving away the multimedia Web development language?

"A halo effect," says Eric Schmidt, chief technology officer at Sun. Fees may be low, but Sun's practice of licensing Java liberally seeds the market with technology on which the company and its partners can feed and grow.

Corporations are committing to sophisticated, pervasive networks, thanks largely to the ubiquity of TCP/IP, Schmidt declares. And Sun is beaming.



Document Title: HR Functional - Business Simplification

Business Simplification Charter

The Business Simplification Organization has two main focus areas. The first is the implementation of enterprise self-service HR systems and tools that put information directly into the hands of the managers and employees that own the information or need the information for their work. The second is the improvement of HR processes and products to make them easier to use, and more aligned with Sun's business objectives. What this means to our customers is early involvement in the development of HR products and, therefore, products that help to move our business forward.

http://e-web.ebay/HR_FUNCTIONAL/HOME_PAGE/CURRENT_RELEASE/index.html

Document Title: Corporate Diversity Home Page

Corporate Diversity

Mission Statement

Corporate Diversity is a highly leveraged organization of committed partners who provide expertise, tools and resources to generate and support diversity efforts throughout Sun.

Services we provide are:

- Diversity training and consultation services
- Sponsorship of diversity events and affinity groups
- Direction and information to meet workforce compliance

Data transfer complete.

❹ The manager pulls up several forms in overlapping windows. The selection includes employee performance rating forms that show the manager how to evaluate the programmer on things such as her value to Sun and her skills and knowledge. Since she's considering reassigning the employee, the manager decides to bring up part of the Employee Handbook to check on several aspects of Sun's hiring policy.

❺ From the Employee Handbook table of contents, the manager clicks on the topic Corporate Diversity and reviews Sun's mission statement and services regarding diversity hiring. Additional information is available through links to other parts of the HR pages, which note any legal requirements for affirmative action or equal employment opportunity.

❻ Back at the HR Information Center home page, the manager also happens to notice a section on the Business Simplification Charter and decides to read it. By putting many HR services online, Sun's business simplification team hopes to save time and paper, and make it easier for Sun employees to find HR information.

The manager is pleased with what she's found on SunWeb, as she now knows how to proceed with the transfer request.

SUN, *continued from page 33*

ing the tools used for annual salary evaluations. Human resources gave Sun managers access to SunSal online tools for a three-week period during salary review time. SunSal includes guidelines for salary ranges by level, salary histories and spreadsheet templates to help managers compare and determine salaries and proposed increases.

In fact, three weeks was half the usual time managers spent on salary reviews. Baldwin estimates the speed saved $325,000 in management time, paperwork and human resources research expenses when the reviews were handled on paper.

Another time- and energy-saver is SunDial, a human resources help center that provides Web access to a wide selection of employee information, including policies, legal notices and employee manuals. In fact, users who ask for help are hyperlinked to the policy reference that relates to the area they've been reviewing. Having such information readily available and easily searchable has cut the number of phone calls to human resources representatives, who can then concentrate on matters the Web can't handle.

Human resources is also putting its quarterly employee surveys online for distribution electronically as Java applets and HTML documents.

Some of the savings are easy to identify – putting the corporate newsletter "Illuminatis" online shaved two-thirds of its cost. Other savings are less obvious, but Baldwin believes employees are taking advantage of information and resources more frequently because they are more accessible.

"We've been successful because Scott [McNealy] committed to universal access early," Baldwin says. Online resources "fit with Sun's culture, and help the bottom line besides."

Managing or not?

Despite its open gateway policy, Sun's intranet is not a free-for-all. The CIO oversees the Network Management committee, which comprises representatives from each division. In regular policy debate sessions, the group has discussed security, content guidelines and proposals for outside access.

But Raduchel insists on an arm's length approach. His department provides equipment and support, but is not heavy-handed about applications. "You've got to create a framework where people can solve their problems," Raduchel says. His watchword is decentralization, and he says the result is innovation.

As corporate controller, George Reyes spearheaded Finance Web.

Backing off from the traditional control also can be freeing for IT, Raduchel observes.

Because Web page creation and basic management are approachable for even nontechnical users, individuals can prepare content for their own pages. In the past, only IT could disseminate information. When users take more responsibility for the content of their own online resources, IT can focus on strictly technical issues such as system support, planning and training.

Still, Sun is only in the adolescence of its intranet evolution.

But Raduchel has another ambitious plan. Eighteen months from now, he wants everyone at Sun to be running "Webtops" instead of regular desktops. Webtops will let an employee log on from anywhere on SunWeb and get a customizable default home page.

For example, an engineer may have links to various programming projects and single-button access into a technical chat session.

"You, the employee, will have some ability to administer content," Raduchel says. The advantage is you can have a consistent environment, no matter where you log on from." ⊜

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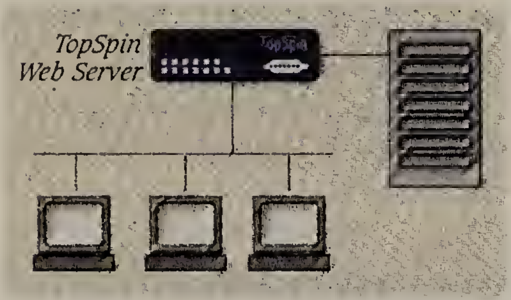

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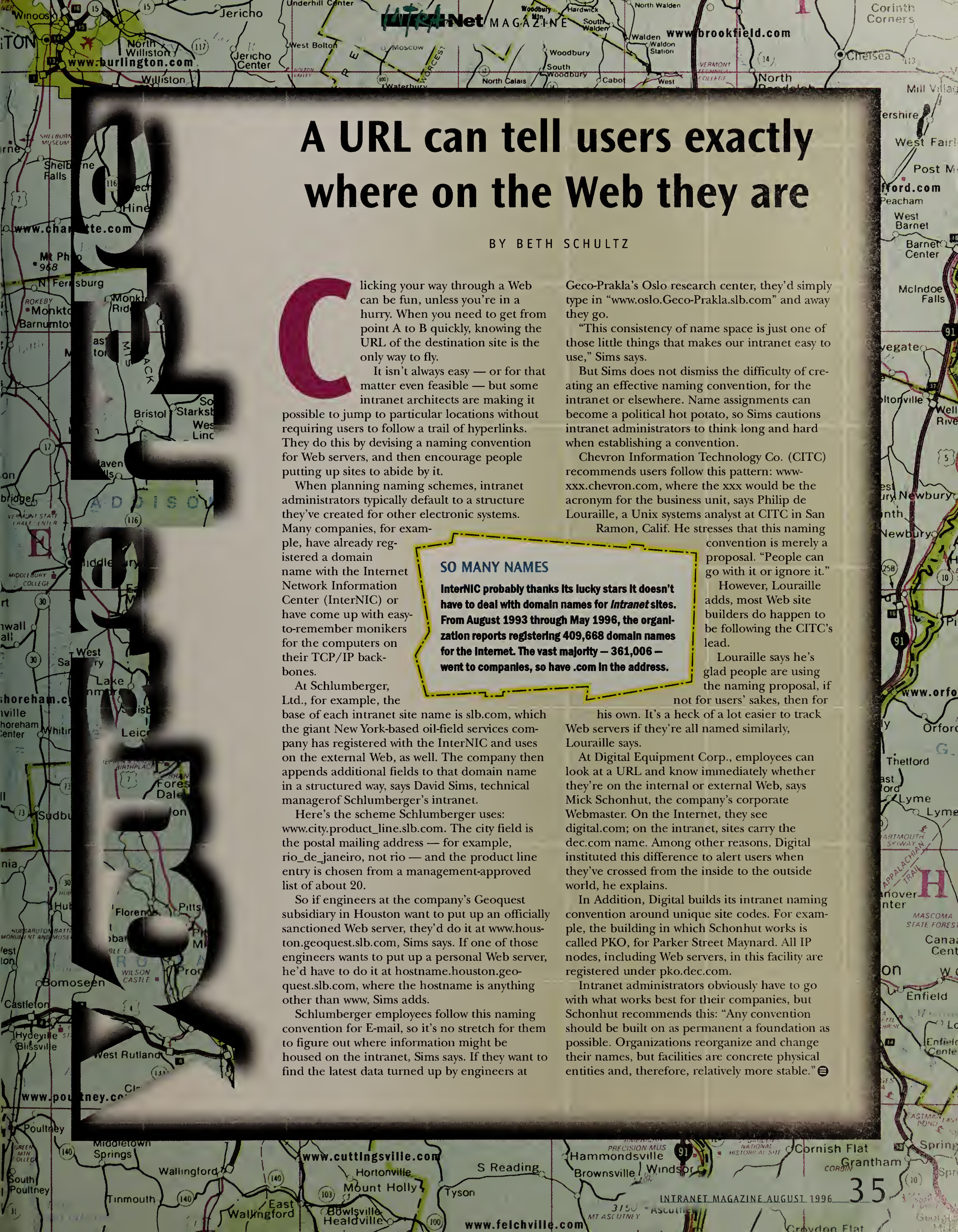

You are he

A URL can tell users exactly where on the Web they are

BY BETH SCHULTZ

Clicking your way through a Web can be fun, unless you're in a hurry. When you need to get from point A to B quickly, knowing the URL of the destination site is the only way to fly.

It isn't always easy — or for that matter even feasible — but some intranet architects are making it possible to jump to particular locations without requiring users to follow a trail of hyperlinks. They do this by devising a naming convention for Web servers, and then encourage people putting up sites to abide by it.

When planning naming schemes, intranet administrators typically default to a structure they've created for other electronic systems. Many companies, for example, have already registered a domain name with the Internet Network Information Center (InterNIC) or have come up with easy-to-remember monikers for the computers on their TCP/IP backbones.

At Schlumberger, Ltd., for example, the base of each intranet site name is slb.com, which the giant New York-based oil-field services company has registered with the InterNIC and uses on the external Web, as well. The company then appends additional fields to that domain name in a structured way, says David Sims, technical managerof Schlumberger's intranet.

Here's the scheme Schlumberger uses: www.city.product_line.slb.com. The city field is the postal mailing address — for example, rio_de_janeiro, not rio — and the product line entry is chosen from a management-approved list of about 20.

So if engineers at the company's Geoquest subsidiary in Houston want to put up an officially sanctioned Web server, they'd do it at www.houston.geoquest.slb.com, Sims says. If one of those engineers wants to put up a personal Web server, he'd have to do it at hostname.houston.geoquest.slb.com, where the hostname is anything other than www, Sims adds.

Schlumberger employees follow this naming convention for E-mail, so it's no stretch for them to figure out where information might be housed on the intranet, Sims says. If they want to find the latest data turned up by engineers at Geco-Prakla's Oslo research center, they'd simply type in "www.oslo.Geco-Prakla.slb.com" and away they go.

"This consistency of name space is just one of those little things that makes our intranet easy to use," Sims says.

But Sims does not dismiss the difficulty of creating an effective naming convention, for the intranet or elsewhere. Name assignments can become a political hot potato, so Sims cautions intranet administrators to think long and hard when establishing a convention.

Chevron Information Technology Co. (CITC) recommends users follow this pattern: www-xxx.chevron.com, where the xxx would be the acronym for the business unit, says Philip de Louraille, a Unix systems analyst at CITC in San Ramon, Calif. He stresses that this naming convention is merely a proposal. "People can go with it or ignore it."

However, Louraille adds, most Web site builders do happen to be following the CITC's lead.

Louraille says he's glad people are using the naming proposal, if not for users' sakes, then for his own. It's a heck of a lot easier to track Web servers if they're all named similarly, Louraille says.

At Digital Equipment Corp., employees can look at a URL and know immediately whether they're on the internal or external Web, says Mick Schonhut, the company's corporate Webmaster. On the Internet, they see digital.com; on the intranet, sites carry the dec.com name. Among other reasons, Digital instituted this difference to alert users when they've crossed from the inside to the outside world, he explains.

In Addition, Digital builds its intranet naming convention around unique site codes. For example, the building in which Schonhut works is called PKO, for Parker Street Maynard. All IP nodes, including Web servers, in this facility are registered under pko.dec.com.

Intranet administrators obviously have to go with what works best for their companies, but Schonhut recommends this: "Any convention should be built on as permanent a foundation as possible. Organizations reorganize and change their names, but facilities are concrete physical entities and, therefore, relatively more stable." ⊜

SO MANY NAMES

InterNIC probably thanks its lucky stars it doesn't have to deal with domain names for *intranet* sites. From August 1993 through May 1996, the organization reports registering 409,668 domain names for the Internet. The vast majority – 361,006 – went to companies, so have .com in the address.

Star power

Science project or strategic decision? Web servers deserve more respect.

BY PEGGY WATT

Web servers are the solar center of your intranet system, the source of heat and light. Your choice of Web server will determine whether your planetary browsers revolve around a young red giant or an aging solar dwarf.

But IT managers are all to willing to leave the server decision in the hands of individuals or department heads.

"I don't think Fortune 500 companies have thought about it enough to be nervous or skeptical, but the Web server is a key part of their entire enterprise environment," says Kevin Tolly, president of the consulting organization Tolly Group in Manasquan, N.J.

A corporation doesn't bat an eye at leasing big iron for thousands of dollars a month or budgeting annual maintenance costs in the hundreds of thousands of dollars, Tolly points out. The same care about and willingness to pay for quality should apply to Web servers. After all, an effective server can supply critical corporate data not easily accessible from any other source. "When corporations need a robust server, they shouldn't mind paying thousands of dollars a month for reliable software," Tolly says.

That certainly runs counter to prevailing market trends today, with highly competitive vendors slashing their server prices — sometimes to nothing — in dramatic bundling deals.

That may be the brave new tradition of Internet technology marketing, but it is no way to run a corporate Web, Tolly says.

But while corporate customers may be willing to shell out for mission—critical Web technology, plus support and maintenance contracts, many of these potential customers say the wares that are worth that commitment aren't available yet.

Vendors may need to be jarred into action, Tolly suggests.

"I think it's going to take a large company that expects to enter the intranet environment and then refuses to implement it because these things are not sufficiently robust," Tolly predicts. "Most Web servers have no transaction log, no restart mechanism. It's one thing to hook things up, another thing to run mission—critical operations."

IT managers need to voice their concerns, agrees William Graham, manager of internet and Web technology for Chemical Bank in New York.

"Don't tie your vision and goals to what vendors are doing this week," Graham suggests. "In our case, we're trying to take a long—term vision of our business direction and determine how we can take advantage of the technology to get there. Given the frequency of announcements from vendors, we need to back off and quit letting the vendors drive our projects."

Despite aggressive upgrades, most Web servers are pale, young yellow stars that need to mature.

The eldest in the intranet galaxy are the Unix servers, notably the National Center for Supercomputing Applications' Apache server. Closely following are others built on that early Apache Unix public domain technology, such as the BSDI Internet Server from Berkeley Software Design, Inc.

O'Reilly & Associates was first out of the chute with a Microsoft Corp. Windows 95 Web server, and has expanded its WebSite line to support Windows NT. The leading Macintosh Web server is WebStar, which Quarterdeck Office Systems, Inc. recently acquired from StarNine Corp. Netscape Communications Corp. supports multiple Unix platforms and, most recently, Windows NT with its suite of servers, notably its Communications Server. And Microsoft, of course, put its marketing muscle behind its not-quite-year-old entry, Internet Information Server, which is bundled with Windows NT.

Also, like browsers, Web servers are showing up as part of full environments. Frontier Technologies Corp. packages an entire intranet — from Web server to browser plus utilities — in Intranet Genie. And Apertus Technologies, Inc.'s Enterprise/Access Web Edition includes a selection of tools to set up electronic commerce transactions. Lotus Development Corp. is getting into the act by bundling its new Domino Web server with Notes.

Because Web server technology is young, IT managers trying to plan ahead several years face more than the usual tricky chal-

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Server studies

Consider this when evaluating tools:

- What is your current equipment (hardware, network, NOS)?
- How big is your intranet now? Next year?
- Can your server scale up?
- What format is content in now? Can the server support or translate it?
- Do you need authoring and editing tools?
- Do you need usage reports?
- Can you get reports through add-ons or your NOS?
- How much privacy do you need (authentication, encryption, firewalls)?

SERVERS, *continued from page 36*

lenges of forecasting. The technology could change significantly as people find new things to do with intranets and as vendors struggle to differentiate themselves.

"They're each trying to own the market, so they're trying to evolve their products in different directions," says Darren Bryden, executive vice president with the consulting group Logical Design Solutions in Morristown, N.J. To duck the trap of incompatibility, hitch your star to a single vendor, he advises.

But for companies such as Honeywell, Inc. in Phoenix, cross-platform compatibility is a necessity. The IT group encourages individual departments to furnish and manage their own server content, so the server must run on whatever system the department uses — be it Unix, Windows NT or Apple Computer, Inc.'s Macintosh.

"For us, it was a matter of choosing between a heterogeneous server environment and picking a standard that would force users to adopt a single platform," says Richard Walsh, systems manager at Honeywell. Companies that give content providers responsibility for keeping systems current will meet with more success if those users can stick with their platforms of choice, he adds. The result is a few more headaches for IT concerning resource management, but not content, at least.

The cautious IT manager prefers a mix of vendors' products, and possibly a mix of platforms, says the MIS manager of a multinational financial institution, who asked that his name not be used.

"We're finding a lot of truly uncharted territory," says Kevin Tolly of the Tolly Group. He suggests evaluators make some small coding mistake, such as changing a directory reference, and see if the whole system or even a branch of the Web falls apart.

PHOTO BY CHRISTINE FINDLAY

"There are a lot of reasons to go with one vendor," such as consistency and interoperability across applications and one-stop support, he says. Consequently, he wishes vendors wouldn't use proprietary features that might hamper interoperability. "I'm very suspicious of exclusive features."

Often, a corporate Web server standard comes about when IT takes on responsibility for the random Web sites launched by departments.

"Our first year, we ran on the O'Reilly WebSite servers that had sprung up in departments," says Frank Matthewson, engineering manager with Bechtel Corp. in Houston, which is building an intranet for nearly 10,000 users. But when IT took charge, the company wanted a standard.

Bechtel is adopting Windows NT, but the company chose not to use Microsoft's bundled Internet Information Server (IIS), but a selection of Netscape servers because, as a rule, Bechtel's IT group avoids first versions of products.

Sometimes the quandary is even more basic: On what operating system should you deploy your Web servers?

"Web servers come out of the Unix environment; that's where the most mature models are," Tolly says. "Does a Fortune 500 company that doesn't typically have Unix want to bring up a Unix server?" They might choose to if there's some advantage to running some other application, such as business-management applications from SAP, he suggests.

And the larger the installation, the more important it may be to have multiprocessor or clustering support, an area that users say Unix still outperforms Windows NT.

Just the Facts

WEB SERVER STATS

		1996	1997	1998
Shipments	Internet	98,530	157,650	236,480
	Intranet	163,960	461,150	601,050
Installed	Internet	155,160	294,200	495,385
	Intranet	207,280	643,550	1,167,350

SOURCE: ZONA RESEARCH INC.

Sometimes it depends on who's choosing. "When the systems people are behind an intranet, they more often go for Unix," says Shel Holtz, president of Holtz Communication and Technology in Clayton, Calif. "Where a task force goes out to investigate and recommend the architecture, they often say, hey, any of us can do this NT stuff." They're not necessarily right, of course; but sometimes that's the choice.

Both Microsoft and Novell are leveraging their network operating systems to extend the functions of their Web servers. Often, the NOS is the source of administration tools, which IT managers complain are generally lacking in Web servers themselves.

"The strategic issue about Web servers for me is how you manage them," says N.K. "Ken" Ouchi, chief information officer of Solectron Corp., a Milpitas, Calif., electronics components manufacturer.

The current crop of Web servers are roughly comparable in features and capabilities, Ouchi says. As an enterprise manager, he wants management and administration tools that vendors currently supply as add-ons or defer to the operating system. But he finds that more mature servers in this still-young product category provide more sophisticated management tools, and that means Unix.

"The Intel platform is often a third the cost of Unix systems," Ouchi says. But for the tools, the extra cost is worthwhile.

"Anything we've done in client/server, we've underestimated the administration costs," agrees Honeywell's Walsh. Honeywell runs the bulk of its business applications on a Unix system now, but Walsh's department is evaluating Windows NT — partly for the system management built into the operating system but largely because they're also considering Microsoft Exchange Server for electronic mail.

Novell and Microsoft are working to interface their Web servers with their mail systems, to accommodate triggers and alerts for designated Web server activities.

"Any kind of integration is a step in the right direction," Tolly says. For example, logon procedures can be set and checked across the enterprise, including the Web server. The NOS may keep event logs for Web server activity. Microsoft's promise of remote management for IIS through its integration with Windows NT caught Ouchi's eye. He's evaluating virtual private intranets, leased lines and other WAN options for accessing and managing 50 servers distributed across multiple sites.

Sun Microsystems, Inc., itself a big intranet user as well as a developer, is designing better administration tools, including remote operations, says Donna Rubin, data warehousing technology manager at SunSoft, Inc.

"We're working on session enhancements, implemented through Common Gateway Interface (CGI) scripts that will allow monitoring and administration from any client," Rubin says.

A truly mission-critical intranet should have the same sort of reliability and fail-safe capabilities of any other crucial enterprise network application, say users and analysts.

"Consider CICS," Tolly says. "Probably half the code in a CICS application deals with recovery and robustness. You don't need that when things are going OK, but things do go wrong, and then you remember why all that code is there.

Besides recovery facilities, managers clamor for a handful of frequently absent functions, such as: the ability to produce usage and activity reports, or even interface with a third-party product that does so; built-in security options and support for supplemental security; and even consistency in the version of HTML supported.

It's the nuts-and-bolts operations that are intranet managers' priorities.

"IT managers are most concerned about infrastructure aspects, like the quality of error messages or how many deadlock timers you have," Tolly says. Servers in his lab have crashed for apparently insignificant transactions, such as one misstep in a NT operating system registry.

"We're finding a lot of truly uncharted territory," Tolly says. He suggests evaluators make some small coding mistake, such as changing a directory reference, and see if the whole system or even a branch of the Web falls apart.

Test, test, test before deploying anything, Tolly says.

"Run your test system for weeks at a time and look for those problems that will come out and bite you," Tolly suggests. Then pass your findings on to the vendors. "We're going to see some missteps vendors haven't even thought of."

It's much better for your star to have a crisis in the lab than to go nova and explode in the field. ⊖

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Managing docu

Team the sophistication of a document-management system with the simplicity of a Web browser and watch the information flow.

BY PAUL KORZENIOWSKI

Remember that memo the boss issued about six months ago concerning revised procedures for requesting money for capital expenditures? You know you filed it somewhere for safe keeping, but you've scoured all the logical places and still can't find it.

Even for the ultra organized, tracking documents can be a frustrating, baneful experience. The numbers are simply too great and the kinds of documents too varied, everything from policies detailing client accounts to memos outlining steps a company must follow to comply with current regulations to press releases highlighting quarterly earnings.

Traditional document-management systems help companies address this problem. They provide proprietary user front ends to central servers, search engines that let users find documents by topic rather than specific name, and file conversion programs. Users can even import files from the document-management systems to their own spreadsheets or word processors.

While sophisticated in their own right, document-management systems take on considerably more power when matched with the openness and simplicity of an intranet. Combine the two, and employees get a cornucopia of electronic information ready for quick perusing.

With the advent of intranets, leading document-management system providers have begun opening their server application program interfaces to Web browsers. Among those who have adapted their products are Documentum, Inc., Hummingbird Communications, Inc., Information Dimensions, Inc., Interleaf, Inc., Open Text Corp., PC Docs, Inc. and Saros Corp.

The expectation is that the growing popularity of intranets could help widen the user base for document-management systems.

"Web usage illustrates the corporate benefits of easy access to pages of information," says Eric Brown, a senior analyst at Forrester Research, Inc., a consulting firm in Cambridge, Mass. "A growing number of organizations are beginning to understand that document-management systems excel in this area."

Information system executives like these Web initiatives because it means they no longer need to support customized document-management interfaces or port pro-

See Documents, *page 42*

ents, Web style

PHOTO ILLUSTRATION: MARK YANKUS

Documents, *from page 41*

prietary front ends to each operating system running at the desktop. Instead, they simply continue supporting the same universal software they've already given employees for browsing the intranet.

Web-enabled document-management systems also make it easy to put information on the intranet, as many provide on-the-fly conversion of documents to HTML format.

What's more, document-management systems function like Web servers, with which employees are growing increasingly familiar and comfortable.

A Web-based document-management system has increased employee productivity and improved the service Edelman Public Relations provides to its clients, says Mark Colby, the firm's CIO. PHOTO BY DANUTA OTFINOWSKI

Users have learned how to search and retrieve information from the Web, so they can now grasp just how capable these systems are.

Document-management systems provide more sophisticated search capabilities than are available on regular Web servers, points out Michael Tanne, a product manager at Verity, Inc., a San Jose, Calif., company that makes search engines. Whereas basic Web search tools let users look for information by typing in one or two words, document-management systems let them gather data by entering three or four key words, he says.

Document-management systems also feature sophisticated security functions and let authorized users freely edit documents and move them from department to department.

Document management by degree

Stanford University in Palo Alto, Calif., has been at the forefront of the intranet and document-management system integration.

The university's document-management efforts date to 1992, when it began trying to limit the amount of paper it was generating by placing internal documents, such as a human resource handbook and public safety policies, on a central server.

"We wanted to move to a paperless office and the Internet offered us a simple-to-maintain, common communications infrastructure," notes Craig Moore, a portfolio administrator at Stanford.

Users accessed the homegrown document-management system via Gopher browsers.

Last fall, the university started phasing out its homegrown Gopher implementation in favor of a more sophisticated document-management system and Web technology from Hummingbird of Mountain View, Calif., Moore says. The software, called CommonGround, evaluates files and presents the document that contains the most references to a topic first and the one with the least last.

On the client side, users work with the company's Columbus Intranet desktop software, which lets them access information via Web browsers.

According to Moore, the upgrades are proving beneficial. Stanford now houses more than 5,000 online documents and the university's faculty, staff and students access the Web-based document-management system more than 100,000 times a day. Students, for instance, use the system to find course registration information.

A pressing matter

The need to implement a document-tracking application also propelled Edelman Public Relations Worldwide Co. to an intranet, says Mark Colby, the chief information officer at this family run, New York-based PR firm.

Historically, the organization, which has 1,000 employees stationed in 29 offices throughout the world, stored client information on diskettes. Account representatives passed these diskettes to peers working on similar accounts on an ad-hoc basis.

Problems arose because employees often did not know if the information they needed had already been compiled by a coworker. Since Edelman operates in different time zones, employees also had difficulty getting information promptly. Account executives in Asia, for instance, sometimes needed to get information from their European counterparts, who would be home sleeping.

Last summer, the public relations company wanted to automate document tracking so it started searching for a product that operated on Microsoft Corp.Windows NT servers. Edelman found ZyIndex for the Internet from Zylabs, Inc. in Gaithersburg, Md. One benefit is the product has tight connections to Web pages: ZyIndex for the Internet generates HTML code based on user input, Colby says.

The change has improved productivity. "Because we moved to the Internet, employees now not only know if information — such as company information or a white paper on an emerging technology — is available, but they also can access it as soon as it is needed and improve the service offered to clients," Colby explains.

POURING DOCUMENTS ONTO THE WEB

Leading document-management system providers have begun adapting their products for use on intranets. Here's a sampling of Web-based document-management systems:

Company	Product	Web site
Documentum	Accelera	www.documentum.com/accelera.htm
Hummingbird Communications	Columbus	www.columbus.hummingbird.com
Information Dimensions	Basis Intranet Solution	www.idi.oclc.org
Interleaf	Intellecte/BusinessWeb	www.interleaf.com/ibwds.html
Open Text	Livelink	www.opentext.com:7777/livelink/otm_ll.html
PC Docs	Docs Open	www.pcdocs.com
Saros	@mezzanine	www.saros.com/prodshow.html

Fair Isaac, Inc. of San Rafael, Calif. is moving away from building client/server applications to designing Intranet applications "The intranet enables us to work with [thin] client systems that are easy to maintain," says David Balaban, the research and development manager for information technology at this developer of mathematical and financial services software.

Last fall, Fair Isaac's human resources department needed to update a resume-tracking application. The company, which has 800 employees, determined that a document-management system would best fit that requirement and also could have additional uses, such as tracking legal and financial documents.

Just the Facts

SURE AND STEADY

While not booming, the document-management market is growing. Delphi Consulting Group, Inc., a market research firm in Boston, says worldwide document-management system revenue increased from $158 million in 1994 to $243 million in 1995.

The software supplier had four criteria for its selection. The package had to work with the Oracle Corp. relational database management system, offer strong security features, include workflow capabilities and support Web browsers.

At the beginning of the year, Fair Isaac selected Open Text Corp.'s Livelink. Balaban said his organization had begun building the resume tracking application and should have it running on its intranet by the fall.

Blockage at the server

While Web-enabling document-management systems will broaden their appeal, they still have downsides. Most current products run on Unix servers and have high price tags, amounting to as much as $500 per user. Recently, however, suppliers have focused development on PC systems so prices are dropping to the $250 per-user range.

Another problem is vendors have designed their document-management products with proprietary server interfaces. Consequently, a department with one document-management system cannot exchange information with one working with a different package.

Vendors are facing up to this issue. In 1995, they began work on a client standard, dubbed Open Document Management application program interface, and a server framework, called Document Management Alliance. Suppliers already have conducted interoperability demonstrations and customers can expect product deliveries by the spring of 1997, according to Carl Frappaolo, an executive vice president at Delphi Consulting Group, Inc., a Boston-based market research firm.

In addition to product limitations, suppliers must change user attitudes. "To install a document-management system, a company must view its documents as a strategic corporate resource and have tight control on its information," Frappaolo says. "Many organizations do not think that way."

Korzeniowski is a freelance writer in Malden, Mass., who specializes in networking issues and can be reached at paulkorzen@aol.com.

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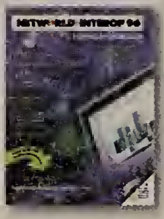

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Manager of New Product Development
UUNET Technologies

"BSDI has integrated the tools and utilities that represent the ultimate Internet operating system."
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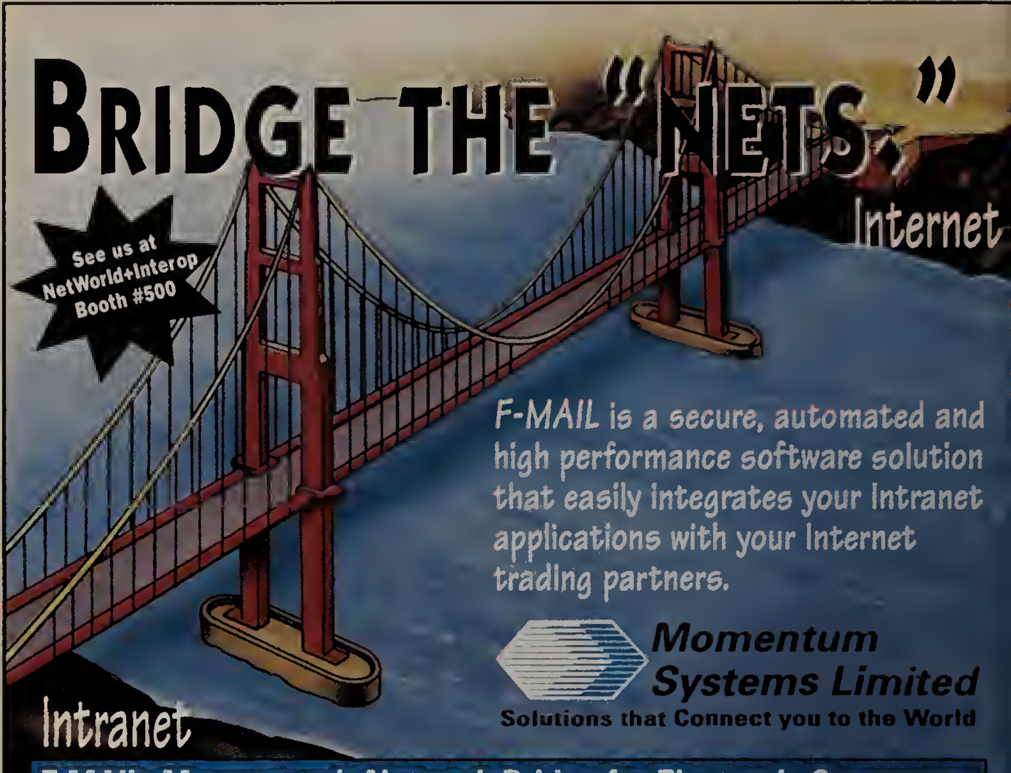

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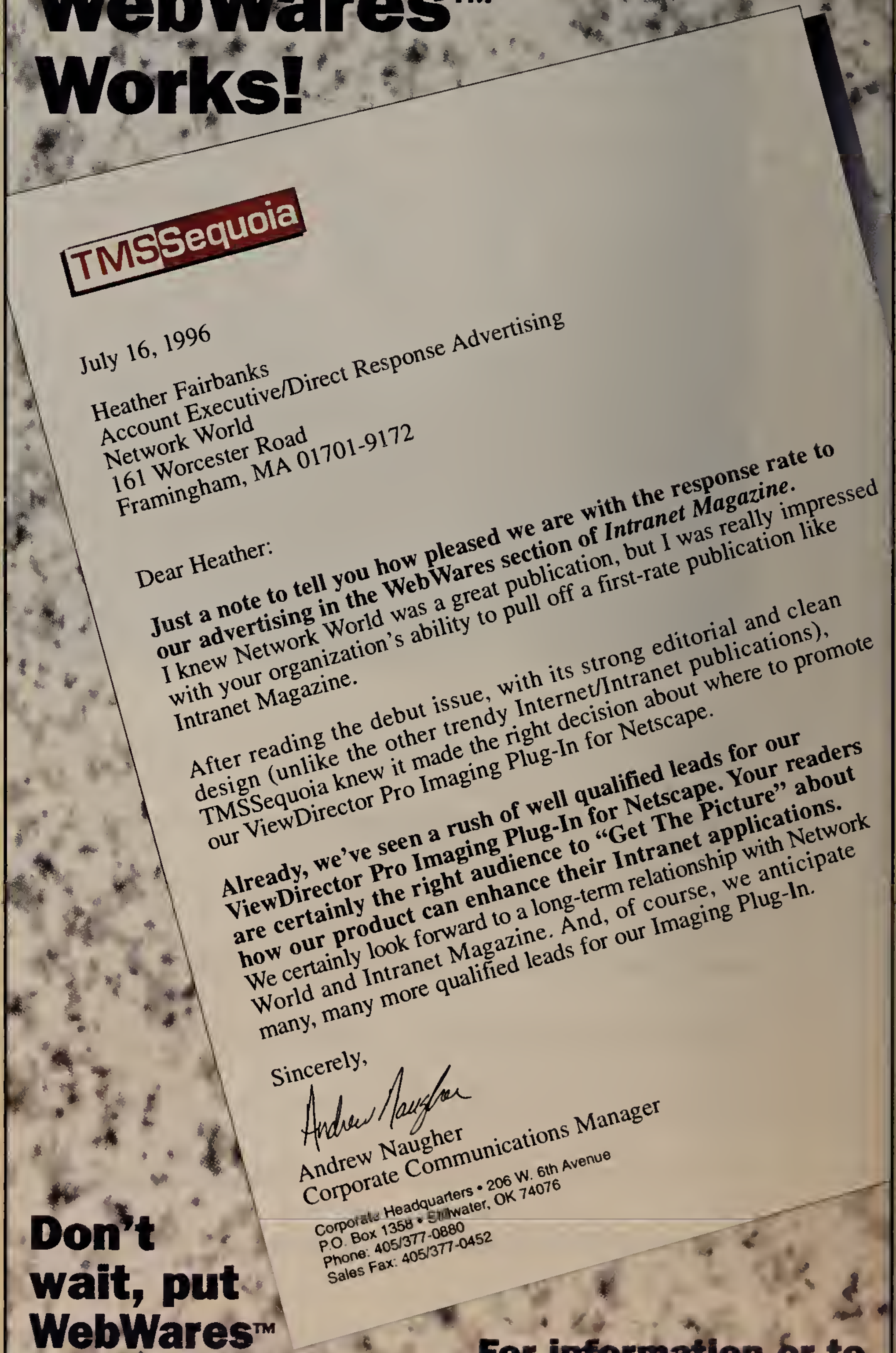

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July 16, 1996

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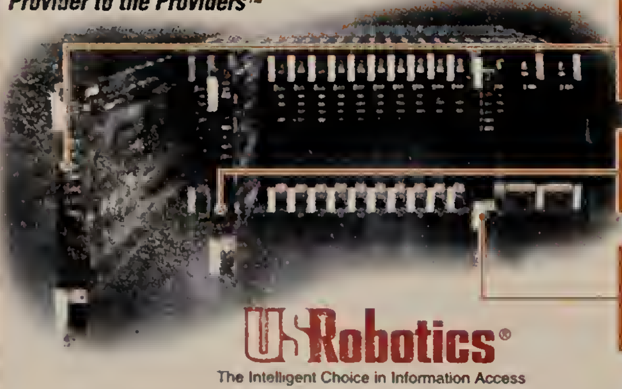

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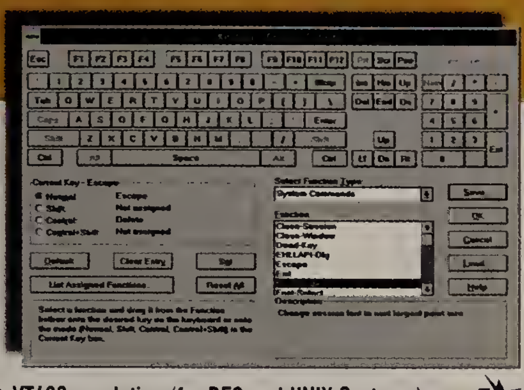

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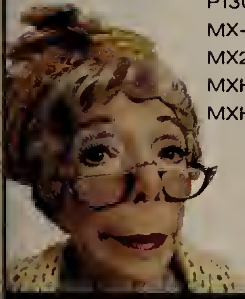

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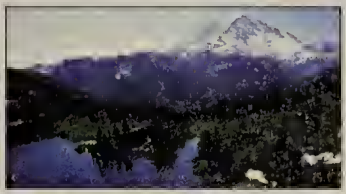

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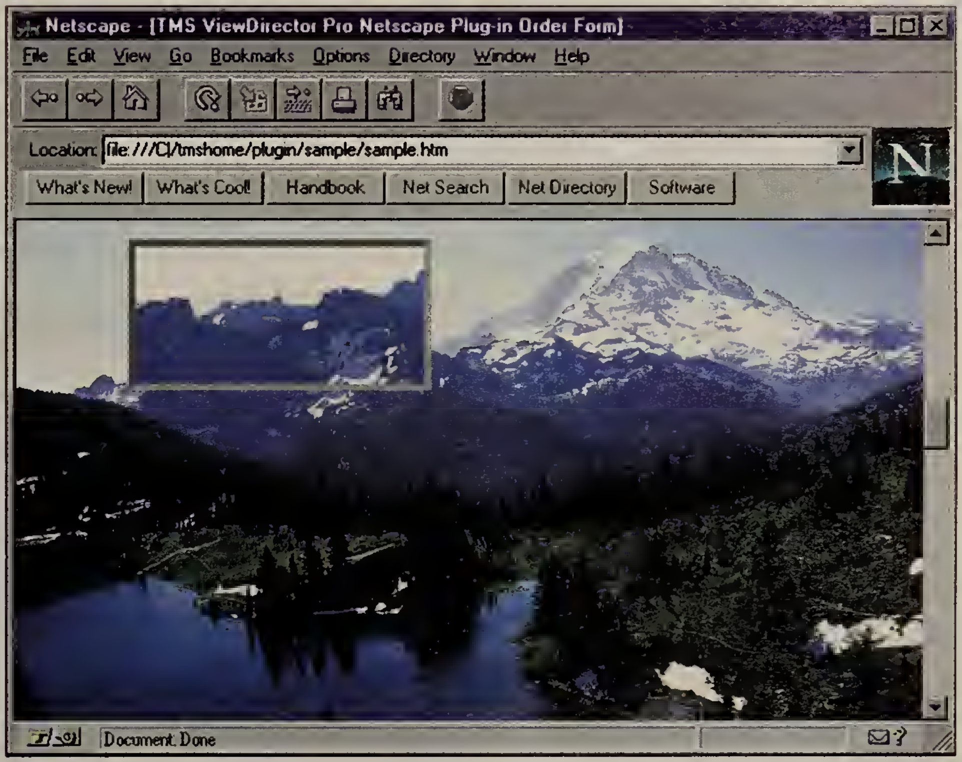
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INTRAVERT • MARK GIBBS

Comrade User:

The Glorious Revolution Needs You

Aug. 12, 1996

Memo to MIS: The following is a transcript from a secret meeting held in your cafeteria yesterday. You might want to take action real quick and get that intranet server running ASAP.

— A Friend

Hi, thanks for coming. The meeting is just about to start so grab a copy of the manifesto . . . yeah, take one of those floppy disks over there marked "Revolution Version 1.1." You what? Oh, sure, you can download the text from www.subversive.net. And the cappuccinos are on the table over there next to those wonderful bran muffins Che brought.

ILLUSTRATION: JOEL NAKAMURA

Welcome, comrades, welcome. I am delighted to see so many of the down-trodden proletariat ready to join the intranet revolution and fight for freedom. This movement will liberate us from the tyranny of information technology groups worldwide.

We are going to start a revolution in the PC marketplace and escape the tyranny of MIS and the megacorporations. (shouts of "Hooray!")

User interfaces and information control are the cause of our bondage. For years, vendors — those leeches on the bodies of working users — have fed on the blood and sweat of our labor. They have dispensed propaganda to IT groups everywhere. They claim their desktop products have "intuitive, user-friendly interfaces" and that they have made data acquisition and information management practical.

These arrogant, running dogs of software product sales have boasted about "empowering the user," "enabling workflow" and even "ease of use." But they lied. (shouts of "Right on, comrade!")

They gave us a billion slight variations of every conceivable application, claiming each new implementation was the true way, that this version would liberate you. Ha!

The truth? Their cunning, devious, imperialistic pitches were planned to seduce IS and ultimately enslave us, the workers, into the infernal, internal illogic of their solutions. I spit on their desktop solutions — *pah.*

Vendors pulled the strings of our IS groups who, in turn, gave us these products as if they were digital manna from heaven. This manna came with interfaces that were as user-friendly as cornered rats and had operational flaws you could drive an 18-wheeler through sideways.

And then IS expected us, the workers on the front line-to just make do. But had they involved us in the selection procedure, did they ask our opinion? No.

But now we have intranets. And we will have our revenge!

We now have user interfaces that take hardly any learning at all. We have Web servers that you, yes you, can get running without breaking into a sweat. Better still, we have the opportunity to find and publish information and do so more easily than filling in a requisition form for stationery.

But it is publishing that will transform our lives and free us from the tyranny of information technology. Now, workers can disseminate any information they choose whenever they choose.

You don't have access to a Web server? Put up your own! It takes hardly any time at all, and you can download the software free from the Web and run it under any of your desktop operating systems.

These underground Web servers already have started to change the balance of power. In many organizations, users smuggled in Web servers and started publishing before IS had even started to think about building an intranet!

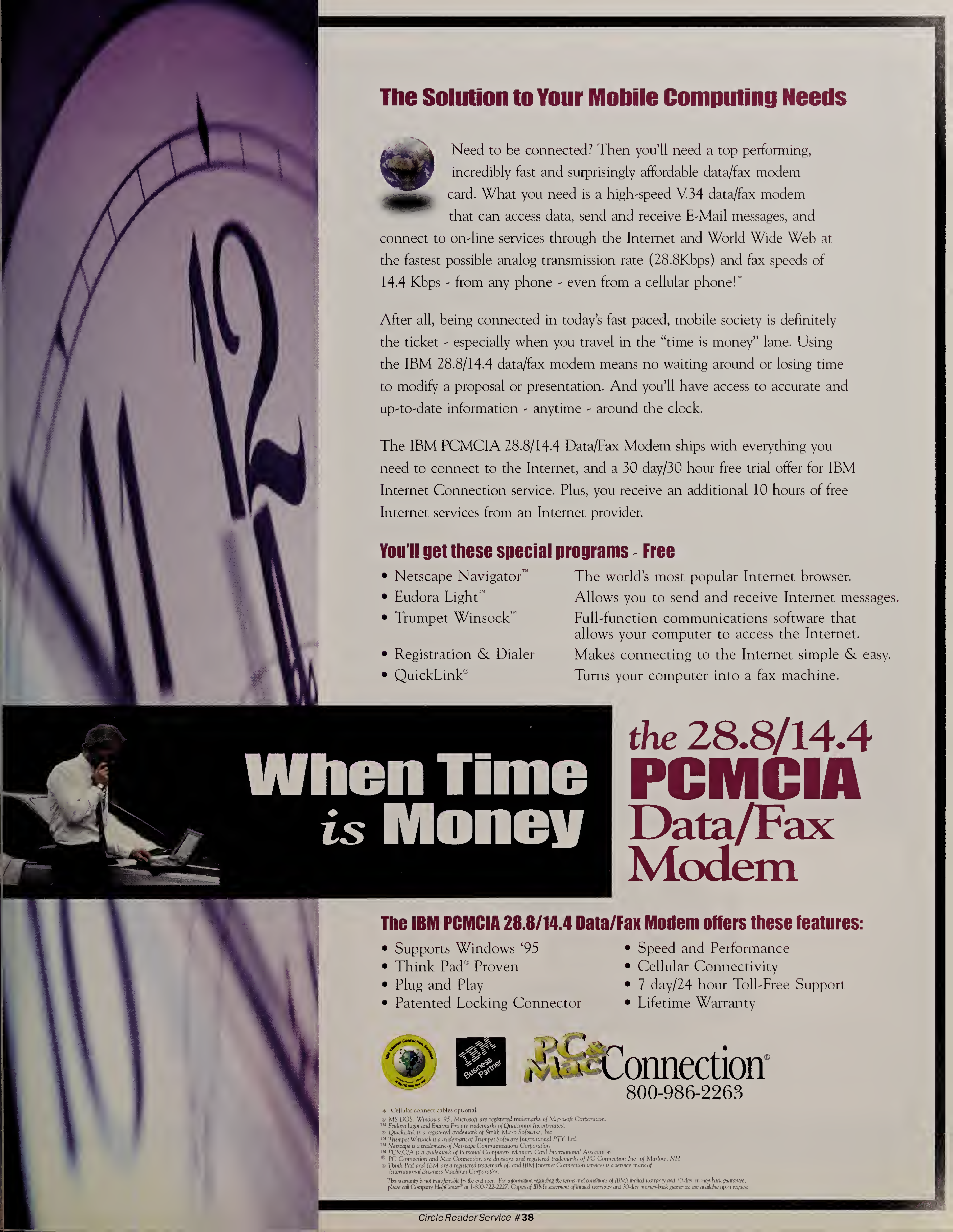
On the day IS put up its official server, a company I know discovered that two others were already up and running. The culprits were the sales and accounting departments — way to go comrades!

What IS doesn't realize is that once we, the users, start to publish, they will lose control. Sure, they can run their network and manage the installation and use of software, but it will be the workers who will drive data acquisition and information management. And this is only proper, because who is it that needs the information? It is us! (sounds of cheering)

So, I urge you to infiltrate and overthrow the information technology bastions: Take control! Demand intranet systems, demand that your data is published and that your information can be found. Put up your reports, your charts, and pictures of your cats.

Comrades, rise up and publish. You have only your information limitations to lose and your jobs to regain. (Cheering and singing breaks out: "We will, we will, rock you.") ⊜

Gibbs is a writer, analyst and editorial consultant for IntraNet Magazine *and can be reached at mgibbs@gibbs.com.*



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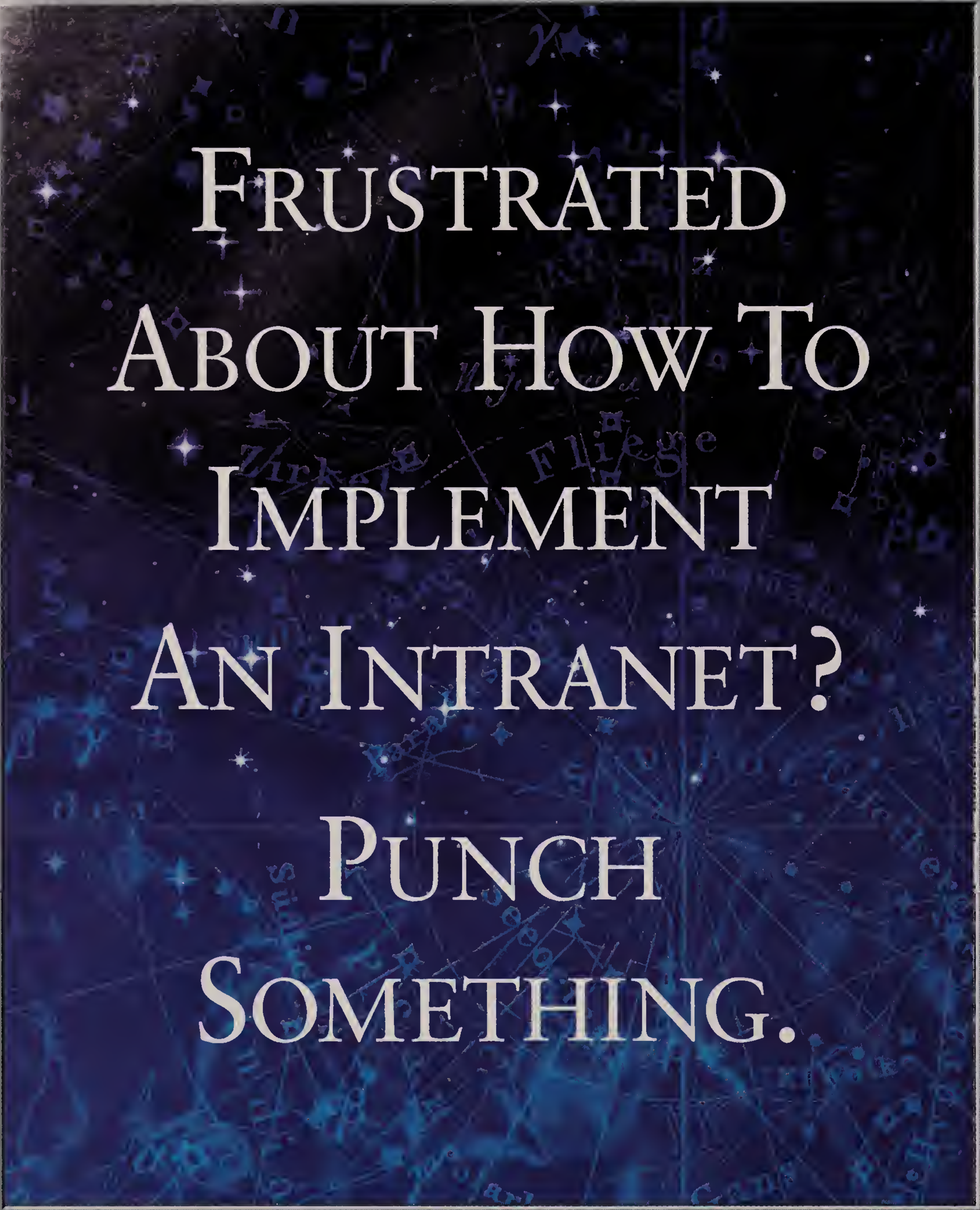

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> The Full Service Intranet, March, 1996

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Technology Update

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Follow-up

In a recent issue, we profiled a problem a LAN administrator was having with server utilization. Several times a week, the utilization shown in the server's Monitor utility hits 100%. When this happens, all users hang until a dip occurs that opens availability. No obvious problem was detected (*NW*, July 29, page 39).

One of our readers has also encountered this problem. The difficulty arose when users activated their AfterDark screen savers, says David Lac, a Certified Novell Engineer and network administrator at Corning Nichols Institute in San Juan Capistrano, Calif. He recommends comparing screen saver activation to server utilization.

James Alvey, a network administrator at Wausau Hospital in Wisconsin, says he faced a similar problem and discovered that the Intel Corp. Netport print servers on the network were sending out between 80 and 250 bindery requests each second. The problem was difficult to nail down, he says, because the behavior moved from Netport to Netport. The company has more than 50 such devices.

Alvey recommends the LAN administrator look at the packets coming into the server to see who the "big talkers" are.

Be helpful

While you're in the Help Desk conference on Network World Fusion, come to the aid of your peers.

In Topic 68, a LAN administrator is looking for recommendations on what help desk software is appropriate for use on a small LAN. The administrator wants the software for tracking problems, inventory and repair status. It would also be nice if the help desk package supports Microsoft Corp.'s Open Database Connectivity since the company uses an SQL server, he says. The administrator has looked at Magic Solutions, Inc.'s SupportMagic and The Molloy Group, Inc.'s Top Of Mind help desk software, but says they're too expensive for a shop his size. The LAN supports 150 users on 100 workstations.

Proposed IETF standard to ease a variety of remote access concerns

Protocol authenticates remote dial-up users and provides for secure connections.

By Richard Sekar

Companies trying to support connectivity for a number of distant sites radiating out from central headquarters are keeping their eye on development of a proposed Internet Engineering Task Force standard for administering and securing remote access.

The scheme, called Remote Authentication Dial-In User Service (RADIUS), provides a centralized and secure method for authenticating remote dial-in users, authorizing appropriate enterprise resources and gathering accounting details. RADIUS also provides a way to integrate the security administration of dial-in users with that of the resident enterprise population.

Designed as a remote access solution, RADIUS addresses a limitation of other authentication mechanisms by providing features for securing both analog and digital dial-in users.

Analog techniques provide a one-to-one relationship between the user being authenticated and the number of open circuits into the network.

Additional security needs to be enforced for digital dial-in, such as over ISDN, since multiple B channels can be allocated on an as-needed basis using the Multilink PPP or Multilink Protocol Plus (MP+) — IETF RFC 1934. Unless they too are secured through RADIUS, these extra circuits can be open doors for intruders.

Securing the initial session

RADIUS is implemented through a client/server hierarchy, where the server is the RADIUS database program and the client is the network access server (NAS). As end users dial in to gain access to network resources, the client passes the user's identification and password information to the server.

If the name and password correspond to the database information, the server authenticates the user for the session and grants access to the network resources authorized by the user's RADIUS profile. A dictionary file kept in the RADIUS database determines the types of attributes that can be included in the user profile. The user repeats this process to initiate every session.

Securing bandwidth on demand

Remote users dialing in over digital circuits can change the bandwidth available to them during the session dynamically if their remote access equipment supports Multilink PPP or MP+. With RADIUS, administrators can identify digital dial-up users through their profiles and can authorize the NAS to add bandwidth on demand in a secure way. As more B channels are dynamically added, the NAS can be configured to require a password from the user or a secret key from the end-user device.

Administrators can secure these circuits via static, dynamic or cached passwords.

With the first option, before a new circuit is dialed, RADIUS prompts the user to enter a static, reusable password. The password can be the same one used initially or a different one, as specified in the user profile.

To prevent intruders from capturing the password as it is transmitted across the network, administrators can configure the NAS to use the Challenge Handshake Authentication Protocol (CHAP), a PPP-based security standard that uses encryption to protect password privacy and verifies the identity of a peer. An agreement between the NAS and the end-user station initiates the CHAP procedure.

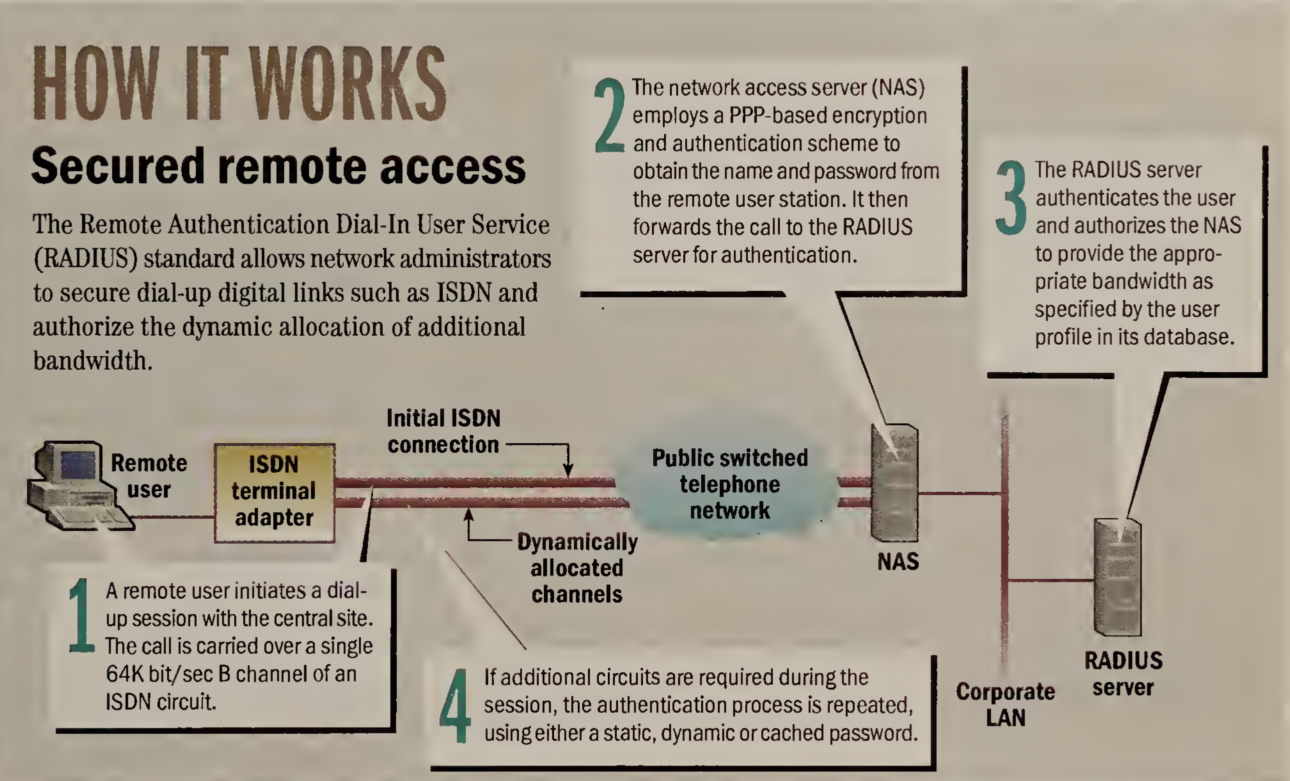
Alternatively, users can take advantage of dynamic password generators, also known as token ID or smart cards, to generate a onetime-use password for each additional circuit in the dial-up session when prompted. In this case, RADIUS works with a third-party security server, such as Enigma Logic, Inc.'s SafeWord AS or Security Dynamics, Inc.'s ACE/Server, to complete the authentication process.

As a final option, administrators can configure RADIUS to capture a dynamically generated password during session initiation for automatic reuse when new circuits are added.

In this case, both the end-user station and the NAS cache the password. Then, when dynamic bandwidth is needed, the end-user station provides the CHAP-encrypted password automatically, and the NAS uses an internal key to authenticate the extra bandwidth transparently. The security administrator can add a timeout value to the cached password, or can configure the system to maintain the validity of the password throughout the dial-in session.

RADIUS has been available as downloadable software from vendor File Transfer Protocol and Web sites, and is broadly supported across a range of remote access products. Vendors such as Ascend Communications, Inc. continue to enhance the software. With this type of vendor commitment, users can expect further development of RADIUS authentication to match the security needs of the growing remote user population.

Sekar is product manager for network security products at Ascend Communications, a remote solutions provider in Alameda, Calif. He can be reached by phone at (510) 747-2134 or via E-mail at rsekar@ascend.com.



HOW IT WORKS

Secured remote access

The Remote Authentication Dial-In User Service (RADIUS) standard allows network administrators to secure dial-up digital links such as ISDN and authorize the dynamic allocation of additional bandwidth.

1 A remote user initiates a dial-up session with the central site. The call is carried over a single 64K bit/sec B channel of an ISDN circuit.

2 The network access server (NAS) employs a PPP-based encryption and authentication scheme to obtain the name and password from the remote user station. It then forwards the call to the RADIUS server for authentication.

3 The RADIUS server authenticates the user and authorizes the NAS to provide the appropriate bandwidth as specified by the user profile in its database.

4 If additional circuits are required during the session, the authentication process is repeated, using either a static, dynamic or cached password.

Need information?

Let *Network World* provide a quick primer on an important or emerging technology. If you have an idea for Technology Update, contact Beth Schultz by phone at (312) 283-0213 or via the Internet at bschultz@nww.com.

EDITORIAL INSIGHTS

Microsoft unfairly slapped

Last week, news leaked out that Netscape is complaining to the U.S. Justice Department about Microsoft's business practices. Netscape, itself a bit of a monopolist, believes that Microsoft should let customers deploy Windows NT Workstation as a server. A big server.

Now NT Workstation — and even Windows 95, for that matter — can already act as a server. In NT's case, use is restricted to 10 simultaneous connections for file and print services. That same restriction was in NT 3.5 and carries over to NT 4.0, except that 4.0 also specifically includes peer Web services.

A brouhaha erupted when Microsoft added a 10-user-in-10-minutes technical restriction to NT 4.0 that would be much more limiting than 10 simultaneous users. Microsoft backed away from that one. But that wasn't good enough for Netscape.

According to Netscape, Microsoft is still "crippling" NT Workstation so users will buy NT Server, which comes with a free Internet server. This is despite the fact that the license agreement did not really change much during the upgrade.

What's the beef? Well, that free server makes servers from Netscape, O'Reilly and others a mite less appealing. And that, according to these vendors, is just so unfair.

It would be nice to be able to avoid shelling out a grand or so for a real server and use a $319 desktop product instead. And choice is always good, too. But Netscape is attacking Microsoft on the wrong front. Microsoft can license its products however it wants. After all, that is how lots of software is sold; single-user license, 10-user, site license — it is all the same code.

Netscape can't have it both ways. They complain that Microsoft gives away products like the Internet Information Server. (Have you paid for your Netscape browser?) Then Netscape complains that Microsoft charges too much for NT Server.

If Netscape wants to be taken seriously, it needs to zoom in on the issue of bundling, and whether that is anticompetitive. I wouldn't get my hopes up, since NT is not yet a monopoly for Microsoft to leverage.

And what's this I hear about Novell bundling Web server software with NetWare?

Doug Barney, news editor dbarney@nww.com

Teletoons

By Phil Frank and Joe Troise
baba@sfgate.com

Well, as you may recall, I did warn you that server clustering would require some new management skills.
Phil Frank

THE BLUE VIEW

More evidence that token-ring switching is coming of age

Anura Gurugé

In a previous column, I contended that token-ring switching, though only a year old, has already started to move toward its next evolutionary phase (July 1, page 36). Cisco Systems, Inc.'s recent announcement that it will complement its Catalyst 1600 token-ring switch with a low-cost Catalyst 2600 provides further irrefutable proof of this evolution.

Cisco is one of several vendors that are marketing multiple disparate, but complementary, token-ring switching solutions. Cabletron Systems, Inc. is also offering two switches — the TSX-1620 (which it OEMs from Nashoba Networks, Inc.) and the ATX (which is based on the Standard Microsystems Corp. technology Cabletron acquired last year). And at NetWorld+Interop 96 in Atlanta, market leader Bay Networks, Inc. is expected to unveil a low-cost Centillion 200 switch to augment its backbone-oriented Centillion 100.

In networking, one size does not fit all. The existence of a series of scalable solutions spanning a spectrum of functionality and prices is always the first definite proof of the maturing of a technology and the market it serves.

For example, routing solutions range from branch office access routers priced at less than $2,000 to backbone routers costing more than $50,000. Token-ring switching is now set to emulate this stratified solutions model with different classes of switches for different areas in the network or different functions.

Let's use Cisco's Catalyst 1600 and Catalyst 2600 as an example. The 2600, which Cisco will OEM from IBM (though its core is built on technology developed by Kalpana, Inc., which Cisco now owns), does not support source route bridging (SRB). Instead, it offers a rock-bottom price of $700 per port and ultrafast, cut-through mode switching, which is ideal for splitting large token-ring LANs into smaller and faster LAN segments. SRB is not required for this so-called LAN microsegmenting application, since all of the new, smaller LANs can have the same ring number as the original token-ring LAN.

A year from now, we are likely to see a growing interest in workgroup switching — if the price is right. The stratified token-ring solutions that we are beginning to see are definitely paving the way.

However, SRB is invariably going to be needed to connect the various LAN segments to the campus backbone, since it is likely that some of the segments will have different ring numbers. This is where the Catalyst 1600, which Cisco OEMs from Madge Networks, Inc., comes in. The 1600 supports SRB and has a reputation for being robust and resilient — albeit at twice the per-port cost of the 2600 — and can be used for the mission-critical backbone interconnections.

This architecture emulates the well-proven formula used in router networks: low-cost access switches at the LAN segment level feeding into a high-performance, high-reliability central backbone switch. By October, we are likely to have even more stratified token-ring switching solutions that will provide even more configuration permutations and flexibility.

Token-ring switches handle three primary networking functions: backbone interconnection, LAN segmentation and workgroup switching. Until now, all the action in token-ring switching revolved around the first two applications.

There has been little, if any, demand for workgroup switching, given that most 16M bit/sec token-ring environments with reasonably sized LAN segments provide adequate bandwidth to end users. However, this is likely to change as enterprises move toward multimedia-oriented client/server applications and Internet access continues to grow. A year from now, we are likely to see a growing interest in workgroup switching — provided, of course, that the price is right. The stratified token-ring solutions that we are now beginning to see are definitely paving the way to addressing this future demand.

Other than price, there are many variables that can differentiate token-ring switches. Key among these are support of SRB, transparent switching and cut-through mode switching; uplinks to ATM, FDDI and Fast Ethernet; advanced filters to eliminate unnecessary broadcast traffic; Remote Monitoring and full-duplex mode. None of today's switches supports all of these capabilities. But the good news is that all these functions are not usually required in the same switch.

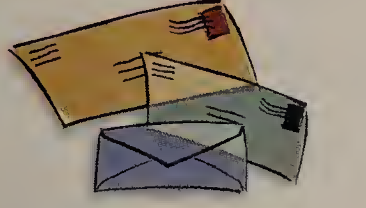
A relatively low-cost switch geared for microsegmentation or workgroup switching does not require SRB or uplinks to ATM or FDDI, but will benefit from cut-through, filters and RMON. The need for full duplex will depend on whether there is a need for high-capacity servers at the LAN segment level as opposed to the backbone.

The key requirements for backbone switches, on the other hand, are uplinks, filters, RMON and robustness. If the backbone LAN servers are using FDDI, ATM or Fast Ethernet, there will be no need for full duplex. In some scenarios there might not even be a need for SRB, given that SRB is mandatory only if redundant paths are required or ring numbers are needed for network management purposes.

We don't really need one token-ring megaswitch that can do everything — for a price. What we need is a range of suitably featured, scalable solutions that specifically address various token-ring switching applications. The current trend is definitely in this direction, as token-ring switching goes through its much-needed rite of passage toward maturity.

Gurugé is an independent consultant specializing in internetworking and IBM network architectures. He can be reached at (603) 878-1303 or via the Internet at aguruge@mcimail.com. His new book, Re-engineering IBM Networks, *is available from John Wiley & Sons.*

MESSAGE



QUEUE

It's in the mail

Regarding your editorial "Learning to hate E-mail," (July 8, page 30):

Your first reason for hating E-mail — sheer volume — is the mark of E-mail's success. As more of your coworkers, customers and vendors move to E-mail, then the volume should increase. What better way to get your attention without the inconvenience of telephone tag or interruptions?

Concerning E-mail blow-offs, as all experienced managers know, you control what gets dumped on you. Just return those attempts to their rightful owners and be thankful that those folks did not come to your office and attempt to meet with you.

Annoyingly constructed messages can be deleted without opening, just like junk mail. If you don't have any business with the offending company or person, the trash is just a click away.

George Humphrey
Emory, Texas

I make it a point that any time I get an E-mail with dozens of addresses, I respond using my E-mail program's quote feature. So the sender gets the dozens of addresses back in the quoted message, along with my succinct "No, thank you."

Herb Parsons
Manager of information systems
Rhema, Inc.
Irving, Texas

You have MAIL!!!

What drives me crazy? Junk E-mail — the kind that promises work-free ways of making tons of money ("Just send us $19.95 for our proven method, and soon you'll be rolling in cash!"). They usually go on for pages, saying the same thing over and over.

One piece of advice: Don't ever respond to one of these messages, even to tell them to flake off. I made the mistake of replying to the sender's E-mail address to tell them to stop sending me their junk. Guess what? It wasn't a real E-mail address; the message bounced.

Then I compounded my mistake by sending the message to the address listed to contact for further information. I received an automated "Thank you for your interest, here's the info you requested."

Since then, I've been getting more and more of this junk, almost every day, as my E-mail address propagates among the 'Net's rip-off artists.

How do we clean up E-mail? I fear it can't be done. We are doomed to flail about in an ever-increasing E-tide of E-mail, until we spend all our time scanning, deleting, filing and occasionally answering messages.

Lance Groth
Network manager
Minnesota Legislative Audit
St. Paul

How do we clean up E-mail? I'd like to offer a suggestion: Let's all stop using E-mail as a toy and start using it as a tool.

Attachments should be kept to a minimum. Try using cut and paste instead of sending the entire document via an attachment. Or take five minutes to retype the important stuff.

Send only the information that is important to only the people who really need it. To just shotgun an entire message to everyone you know says: "My time is too valuable to communicate effectively." Time to grow up and be responsible.

Jim Meyers
Systems development specialist
Sundstrand Aerospace
Rockland, Ill.

Differs on distance

In his article "Knowing UTP wiring basics can boost local net performance" (July 8, page 29), William Stallings quotes the recommended maximum distances for LAN media without considering any of the cross-connect or patch cord distances. This gives the appearance that unshielded twisted pair (UTP) runs only 90 meters instead of 100 meters.

The 90-meter limitation is actually the maximum horizontal distance from the wiring closet to the wall outlet, not the entire end-to-end distance.

If you consider all of the patch cord requirements as outlined by the specification, they would include 3 meters of patch cord from the active component to the first patch panel in the wiring closet, 3 meters of cross-connect between the first and second patch panels in the wiring closet, and 3 meters of patch cord at the computer or wall outlet side.

This makes 99 meters, plus an additional meter allowance, for a total maximum UTP run of 100 meters.

I also believe Stallings' maximum recommended distance for single-mode optical fiber — 3,000 meters — is wrong. Optical fiber distances are really determined by loss budgets. You can have run lengths ranging from 15 to 20 kilometers based on fiber quality, number of splices/connectors and the quality of those terminations.

Marshall Eisenberg
Manager, sales development
Bay Networks, Inc.
Santa Clara, Calif.

Stallings responds: The 90-meter distance for UTP quoted in the article is the actual cable length as specified in the standard. I agree that the distance covered is somewhat greater because of the connectors and patching.

The 3,000-meter figure for single-mode fiber is also the distance specified in the standard. The standard contains a reference to the fact that longer distances are possible for certain applications but that these are beyond the scope of the standard.

Unfair comparison

In his criticism of CompUSA in his column "Lead me to the office, take me to the pilot, I am but a gadget fan" (July 8, page 54), Mark Gibbs says: "People more indifferent, less informed and less interested in customer service would be hard to find outside of a government department." As a government worker, I take very serious issue with this statement.

Every survey done in the past few years consistently proves that more than 85% of all government workers are competent, knowledgeable and caring individuals, striving under the most adverse conditions to deliver government services to a public operating under severe misperceptions about government workers. The vast majority of us do our jobs with more integrity, knowledge and support of our customers than most private-industry firms I could mention. I would hope to read Gibbs' apology to all government workers in the near future, but I'm not going to hold my breath.

Wesley Martin
Computer specialist/LAN manager
Bureau of Reclamation
Department of the Interior
Washington, D.C.

Gibbs responds: You are absolutely correct: My cheap shot at government workers in general was not fair. I retract the remark and apologize to all who may have been offended.

Perhaps I should have written: "People more indifferent, less informed and less interested in customer service would be hard to find outside of the Iraqi human rights department." I can't wait to see their complaint.

United they stand

I agree with your editorial on the need for Unix vendors to wake up and smell the Java — er, coffee (July 15, page 40).

Microsoft Corp.'s ability to rally developers into a single direction and operating system is key to its success. In contrast, the Unix vendors play tug-of-war with one another. And who is the rope? The developers who are trying to write the software.

This whole battle is reminiscent of Europe's struggle against Japan. The Japanese companies had a single focus: to dominate the manufacturing and economic world. The European countries were so busy beating each other up that they could not individually compete against the Japanese. So they set out to form a unified Europe.

Some Unix vendors are going to have to lay down their arms — otherwise, no one will be able to keep up with Microsoft's marketing machine.

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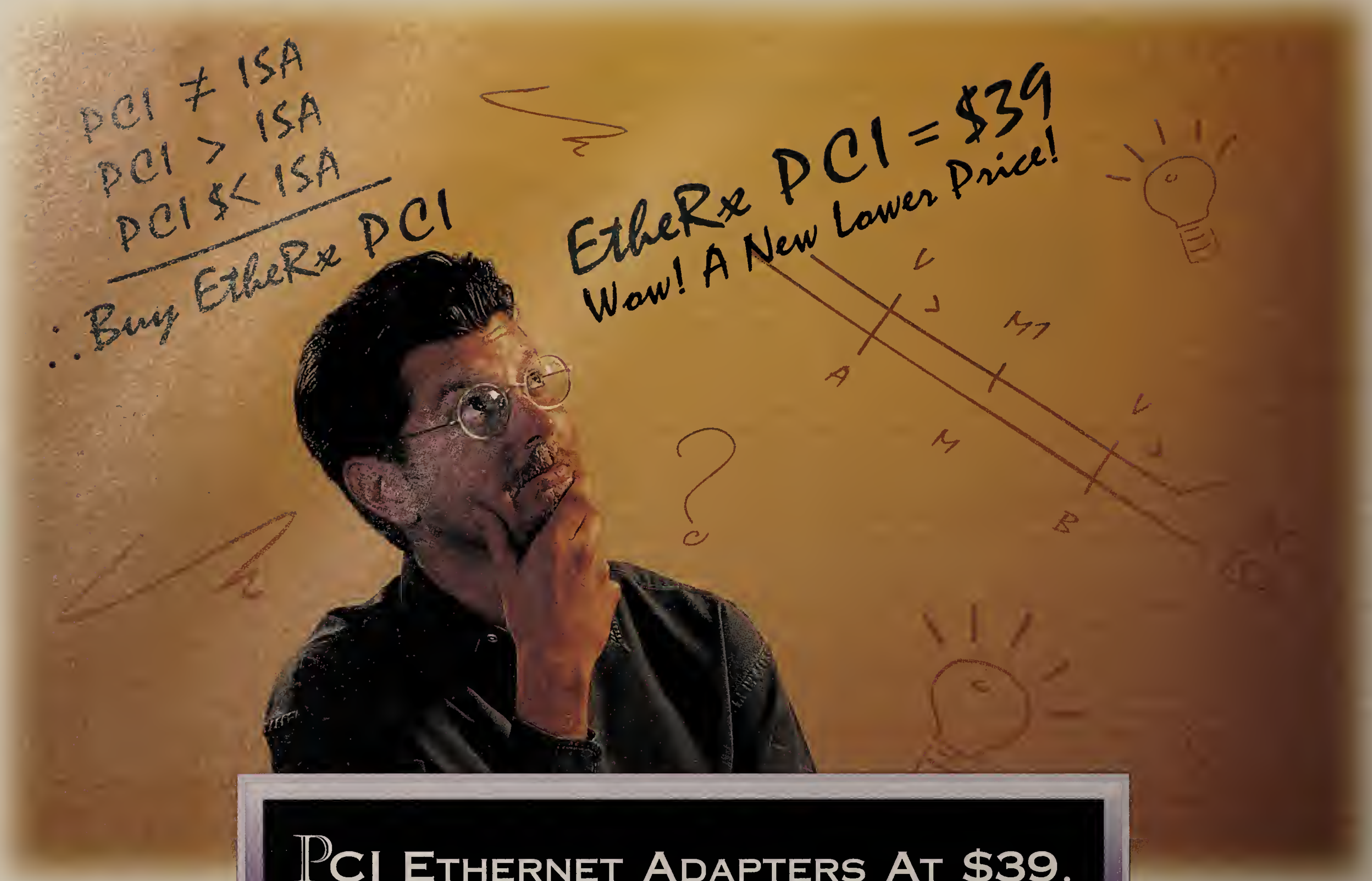

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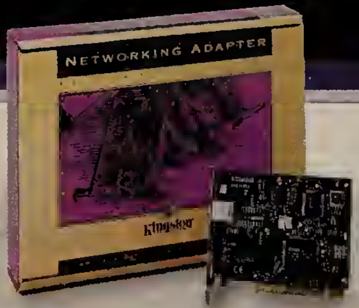

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Backbone of contention

Bay, Cisco and 3Com wrangle for enterprise router crown.

By Edwin E. Mier

Most enterprise users already have a router-based backbone network up and running. However, if your backbone routers are more than a couple years old, chances are they're getting tired. And depending on the brand and vintage of router management software you're running, you may not know if, or how much, user traffic isn't making it through.

We asked Cisco Systems, Inc., Bay Networks, Inc. and 3Com Corp. — whose combined market share amounts to 90% of the high-end router market, according to International Data Corp. — to submit high-end boxes configured to concurrently support multiple dual FDDI ring and 100Base-T interfaces, as well as several Ethernet ports. If they had space on their backplane, we asked them to include a couple of serial and token-ring ports. We also asked for their latest and greatest management wares.

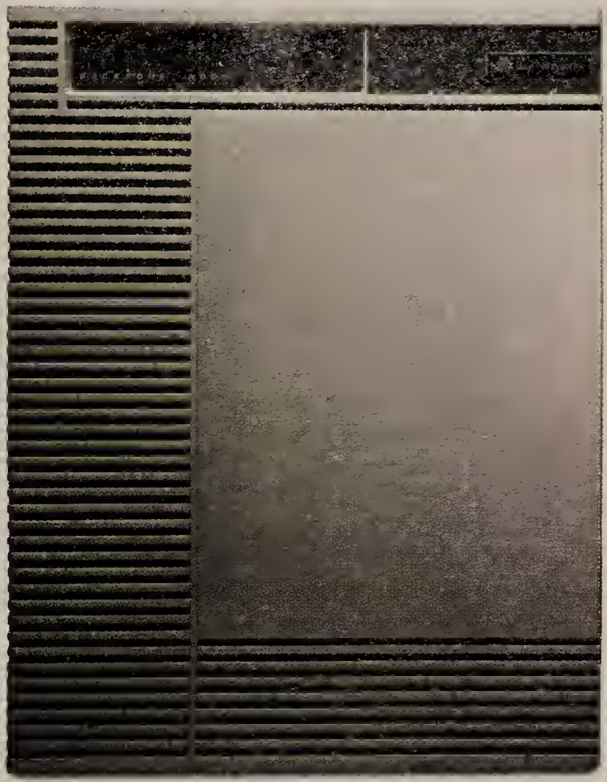
The machines we tested represent somewhat different points on the high end of the router spectrum. We found Cisco's and Bay's products to have an edge over 3Com's NetBuilder II. If throughput performance is most important for you, Bay's Backbone Communications Node (BCN) definitely edges out the competition. If you attach more importance to certain advanced features that Cisco now ships with the 7200, then Cisco becomes your choice.

Bay's BCN workhorse

The largest and highest capacity router we tested was the BCN, a 14-slot system that was configured with all the interfaces we asked for and then some, and still had slots left over for more interface modules. With all this, as well as one primary and three redundant power supplies, it's not surprising the system needs a special power receptacle to feed two-phase, 220 alternating current voltage and a minimum of 20 amps.

Putting the power issue aside, you also have to be able to access the BCN from the front and back sides, so you need considerably more space for it than either the Cisco or 3Com routers — each of which need only a regular 110-volt, three-prong grounded outlet.

Now the good news: The BCN's internal architecture, featuring two fully redundant 500M bit/sec buses and router processing, which are distributed to the processor boards accompanying each interface module, make it the most robust, reliable and fault-tolerant system of the three we examined.


Bay Networks' *Backbone Communications Node*

The range of interface modules offered for the BCN is also the most complete and extensive of the three routers, especially with its ATM, ISDN and other WAN offerings; 3Com's repertoire, however, is also fairly complete.

Where the BCN clearly outweighs the competition, though, is in capacity. You can load up this box with your choice of more than 60 WAN/serial interfaces, more than 50 Ethernet or token-ring interfaces, more than two dozen 100Base-T ports, or more than a dozen FDDI-dual-attach station (DAS) or ATM 155M bit/sec interfaces.

The BCN is a workhorse router, and exhibited, by far, the greatest throughput of the three routers tested (see story at left). We threw nearly a quarter of a million packets per second at the BCN, and it correctly forwarded them all. That's more than double the load the Cisco 7200 could handle, and nearly four times what 3Com's NetBuilder II could forward. And because the BCN had no problem with our maximum-load test, we're not sure how much more it could take on before it got tired.

The BCN doesn't quite reach the level of its competition when it comes to ease of use or special features. Unfortunately, an EZ-Install Windows application that Bay offers for configuring its lower end routers isn't supported for the BCN. Also, in

You get what you pay for in enterprise routing

Can any router handle the worst case load that your backbone nodes will endure? Not according to our tests. Then how do you ensure that you're purchasing a product that's adequate for your heavy traffic load? Among the routers we looked at, it seemed that price was proportional to throughput. We determined before testing began that we would develop a set of three modular traffic loads, which we would apply one at a time to each router, then all three concurrently. These loads all consisted of IP-only, unicast (that is, nonbroadcast) packets.

The routers were all tested with only IP routing configured on all interfaces. Anything else that could sap the router's processing power — and, thus, reduce throughput — was turned off or disabled. For example, there were no filters (or, in Cisco parlance, access lists) applied during the load tests.

All of the traffic load we delivered in these tests was made up of 64-byte packets. Generally speaking, a router's work is done on a per-packet basis, so a router works about as hard to process, say, a 250-byte packet as it does a 64-byte packet. However, by using 64-byte packets, we could deliver a lot more per unit of time than we could if we had used a larger packet size.

Our first volley was interleaved IP traffic that was delivered to three of the router's Ethernet interfaces, and which the router had to forward, packet by packet, to one of three other output Ethernet interfaces. The load was delivered at the wire speed of Ethernet, which equates to a total load of 44,640 packet/sec. This equates to a user data volume of about 23M bit/sec (not 30M bit/sec, the total bandwidth of three Ethernets, because of the interframe spacing delays that are required between packets sent on Ethernet).

The second wave consisted of another interleaved IP packet stream delivered to a Fast Ethernet (100Base-T) interface on the router, which the router had to forward, packet by packet, to an output 100Base-T interface. This 100Base-T load actually consisted of six wire-speed Ethernet streams, which were concentrated onto a 100Base-T uplink by a UB Networks, Inc. GeoRim/Edt switch. So this total load, 89,280 packet/sec, equated to a user data volume of about 46M bit/sec — filling roughly half the total bandwidth of a 100M bit/sec, Fast Ethernet LAN.

The third and last load was delivered via FDDI. This was a 100,000 packet/sec IP packet stream, which the router had to forward, packet by packet, to an output FDDI interface. This amounted to a user data volume of about 51M bit/sec, or roughly half the total bandwidth of a 100M bit/sec FDDI LAN.

Bay's BCN accepted and successfully forwarded all traffic, whereas Cisco's 7200 handled only about 44%, and 3Com's NetBuilder II managed only 28%. The percentage of each traffic load that was successfully forwarded varied. (For example, the Cisco 7200 forwarded 61% of the load delivered via the three Ethernets, 38% of the 100Base-T load and 37% of the FDDI load.) Both Cisco and 3Com scaled their processing throughput across all interfaces as the combined load exceeded the router's maximum capacity for its configuration.

All of these numbers and observations apply with certainty only to the specific configuration we tested, and with the specific traffic pattern we applied — all unidirectional, 64-byte IP packets. In a different configuration and with a different traffic pattern, the resulting throughput would also likely be different. Surprisingly, the throughputs we observed map fairly closely to the routers' prices. Thus, users do tend to get what they pay for.

— Edwin E. Mier

some areas where the competition had lots to show — such as advanced security features, virtual LANs and hot-standby switchover of WAN links — Bay came up empty-handed. The vendor says many such features are under development and due out in subsequent software releases.

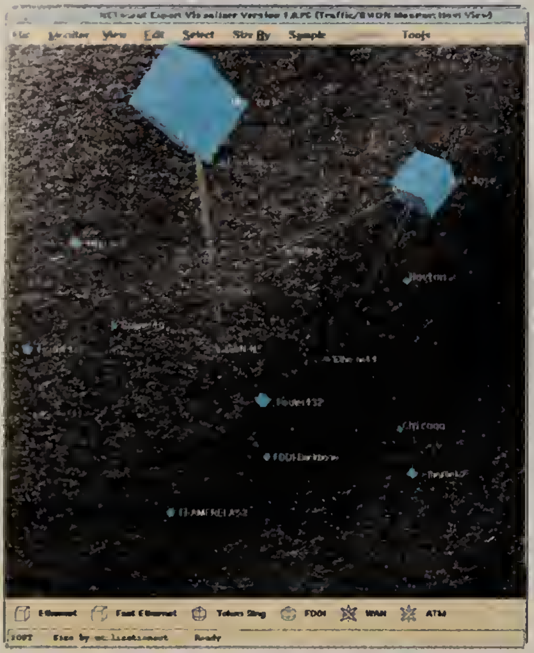


Figure 1: *Frontier Software's Visualyzer application generated this representation of real-time traffic flow traversing a Cisco 7200 router. The cubes represent end nodes, which automatically size proportionally with the amount of traffic they are sending and receiving. The thickness of the lines connecting the cubes represent the bandwidth used.*

Bay's showing in the management and administration category was mixed. It finished second, just behind Cisco and just ahead of 3Com. Of major concern was the inconsistency between Router Manager and other applications included in Bay's Optivity suite, which came from the SynOptics branch of the premerger company, and Site Manager, a fairly unglamorous application Wellfleet had long-offered for managing its routers.

If we had a choice, we'd use Site Manager rather than the whole set of more glitzy Optivity applications because Site Manager includes very good router configuration and software management, and accurate performance, status and traffic statistics. We found the Optivity applications — in particular RouterMan — lacking and, in several cases, they reported inaccurate or unreliable data.

But there was one gem among Bay's management wares that deserves special note. This is a feature called packet capture, which lets the user tell the router to be on the lookout for any type of packet, based on any user-specified criteria, on any interface. Packets that meet the criteria can be captured, displayed and decoded via an easy-to-use and understandable graphical user interface. We used this feature in the setup of our lab tests for the BCN. Its value as a diagnostic tool cannot be overstated.

Cisco's innovative package

Cisco gave us its 7200 to test, describing it as "the new low-end model of our high-end router line," which includes the older 7000 and 7500 series. The unit is compact and offers just six slots for interface modules.

The 7200 did accommodate the necessary FDDI, 100Base-T and Ethernet ports we needed for throughput testing, plus a four-port serial module. However, there wasn't enough room left over for token-ring ports.

Cisco offered us the 7200, in part because of new support built into the router for NetFlow Switching, a new Cisco approach to routing, in which the router builds a flow profile for communicating nodes based on various details it learns when the nodes first set up their connection. Subsequent data packets that are affiliated with this flow are then forwarded automatically.

This saves time and router resources over the traditional method, where the router makes forwarding decisions on a packet-by-packet basis, according to Cisco. In the vendor's current implementation, only IP traffic is supported.

Management data pertaining to NetFlow Switching activity is not retained within the router. Instead, this data is exported to a waiting, external Remote Monitoring (RMON) probe. This takes the burden of handling this data off of the router's processor.

The RMON device we used in the lab, a dual-Ethernet RMON probe from Frontier Software Development, Inc. that Cisco resells, collects this data from the router using a proprietary data format that's sent via the User Datagram Protocol (UDP). The RMON probe acts as a proxy for the router, at least for the reporting of NetFlow data, and responds with this data when queried by a special management application on an SNMP management station.

We used the Visualyzer application, a part of Frontier Software's NetScout software suite, to display the NetFlow Switching activity (see Figure 1). The result is an impressive representation of real-time traffic activity through the router, and a futuristic display with no numbers. Rather, there are end-node symbols and interconnecting links that dynamically autoscale in size and width to graphically show the amount of traffic activity and bandwidth being used.

Cisco is the first kid on the high-end router block to add a Web server to its router to support management access. Using a Netscape Navigator 2.0 browser (not all Web browsers support all the features used in the Cisco implementation), you can connect to the router and browse an interactive, graphical equivalent to the Cisco command line. Indeed, the security logon is the same as for remote telnet access to the router.

Clearly, there are benefits to managing remote network devices in this manner:

Cisco Systems *7200*

SCORECARD

	Bay BCN	Cisco 7200	3Com NetBuilder II
Overall score	**7.4**	**7.4**	**6.3**
Management and administration (30%)	6	7	5
Performance (20%)	10	7	6
Networking and connectivity (15%)	9	9	8
Ease of use and documentation (15%)	6	7	8
Special/advanced features (10%)	5	7	4
Installation and configuration (10%)	8	8	8

Scores based on a scale of 1–10. Categories are weighted by the percentages shown.

NetResults

Product	**BCN (Backbone Concentrator Node),** 14-slot chassis, running Release 10.00 router software	**Cisco 7200**, 6-slot chassis, running Release 11.1 router software	**NetBuilder II**, 8-slot chassis (half-width slots, or 4-full-width slots), running software Version 9.0.0.10
Vendor	Bay Networks, Inc. (508) 670-8888 www.baynetworks.com	Cisco Systems, Inc. (408) 526-4000 www.cisco.com	3Com Corp. (408) 764-5000 www.3com.com
Price as tested	$133,050 for hardware, plus $1,100 to $2,250 for router software (depending on protocols and functionality), and from $200 for Site Manager to $14,000 for full Optivity Enterprise suite management software.	$64,700 for hardware, plus $2,000 to $8,000 for router software, and management software from $2,495 for CiscoWorks/Windows to $9,995 for full CiscoWorks/Unix suite. Ethernet Switch Probe, $3,500. Frontier Software's NetScout management software, $5,000.	$57,655 for hardware, plus $1,000 to $3,995 for router software, and from $3,495 for Transcend/ Windows to $9,495 for full Transcend/Unix suite management software.
Pros	▲ Best redundancy/hot-standby options and fault-tolerant design. ▲ Offers the most slots (13 are available for user interface modules) and highest capacity of high-speed links per router (13 FDDI-DAS or 13 ATM-155 or 26 100Base-T). ▲ Best throughput performance. ▲ Most complete and extensive WAN interface support (including ISDN-PRI, ATM-155 and ATM-45, with SVCs and LAN Emulation).	▲ High-density Ethernet cards, 8 ports per module (up to 48 per system). ▲ Rich features, including Hot Standby Routing Protocol, for configuring alternate, redundant and backup links. ▲ Extensive features for traffic prioritization, WAN link compression, Virtual LANs and security. ▲ Web server within router supports a browser-based version of the command-line interface.	▲ Very good user interfaces for router configuration management and for setting traffic filters (with many predefined, canned filters). ▲ Management application is coherent and well organized. ▲ Good interface for setting threshold values for monitoring router values and issuing alarms.
Cons	▼ Special power and receptacle outlet required. ▼ A Windows-based tool for easy router configuration doesn't work with the high-end Backbone Node models (Site Manager application is used instead). ▼ Overlapping and inconsistent management applications (OmniView, RouterMan, Site Manager) provide different — and conflicting — views of router performance and statistics.	▼ No ATM or ISDN support yet for the router model and software version tested. ▼ Some module compatibility issues between models of vendor's high-end router series (7xxx). ▼ Most arduous, nonintuitive command-line console interface. ▼ Inconsistent set of management applications provide disparate management capabilities and very different views of router performance and statistics.	▼ Limited high-speed interface capacity; maximum of 2 FDDI or 2 ATM-155 interfaces per router (up to 8 100Base-T, or 24 Ethernet, however). ▼ Lowest overall throughput. ▼ Traffic statistics reported by management application were found in many cases to be unreliable; there's no breakdown of errors or traffic by protocol.

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For example, an equipment vendor won't have to produce multiple versions of its applications for a plethora of different management platforms, such as HP OpenView, Windows NT, IBM NetView and SunNet Manager.

But it's not clear whether Cisco's current Web browser/server implementation, or the additional load and processing burden that this imposes on the router where the Web server runs, are worth it today. The current Web browser interface provides a quasigraphical form of Cisco's notoriously nonintuitive command-line interface. And it is just a little easier to use than the command line. But you've still got to know quite a bit about the Cisco command-line structure to find your way around the new browser interface.

The bottom line: If you knew as much about the Cisco command-line interface as you'd need to use the new Web browser interface, you'd probably just continue to telnet in and use the command line.

HOW WE DID IT

We asked the vendors to equip their routers with two FDDI-DAS, two 100Base-T Fast Ethernet, six Ethernet, two token-ring and two serial/WAN ports capable of supporting up to E-1 (2.048M bit/sec) links. We requested this mix to see how well high-end routers performed and how they managed multiple modules.

Two of the products, Cisco's 7200 and 3Com's NetBuilder II, couldn't concurrently accommodate all of the interfaces specified, so we began the evaluation with the interfaces we needed for throughput testing – two FDDI, two 100Base-T and six Ethernet (see diagram below). After throughput testing, we swapped out some of the installed interfaces and replaced them with the serial and token-ring modules to complete our evaluation of the administration, monitoring and management.

We evaluated each router through a detailed task-based methodology. The six categories were:

■ **Installation and configuration.**

■ **Ease of use and documentation.**

■ **Features.** We focused here mainly on special and unique features, over and above the routing and bridging capabilities common to all these systems. For example, we examined features relating to protocol prioritization; ability to automatically detect and respond to down-link and degrading-link conditions; virtual LAN support and features; security features, for control of passing traffic as well as access to the router; and fault tolerance.

■ **Networking and connectivity.** We examined the router's software support for leading routable protocols and routing control protocols, as well as their handling of nonroutable protocols (such as SNA, NETBEUI and DEC LAT), bridging features and WAN protocols and interfaces (such as frame relay, X.25 and ATM).

■ **Management and administration.** We used all of the management applications for router configuration, internal health and status reporting, alarm and event management, long-term traffic monitoring, reporting and report generation, and traffic reporting.

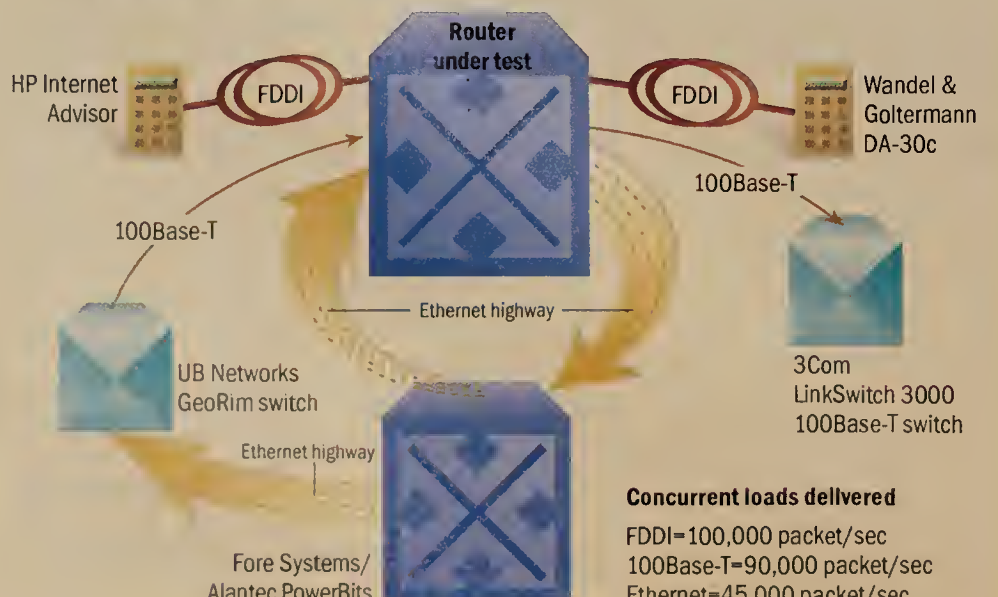
■ **Performance.** The main component here was throughput performance, but we also carefully noted any incidents affecting the software stability of the router.

Measuring throughput was the most complex aspect of the evaluation. We generated traffic from multiple sources to be delivered to multiple interfaces on the router concurrently, and we carefully monitored the total traffic volume delivered to, and forwarded by, the router.

In a separate subsequent phase of the testing, we evaluated the ability of the router to correctly report protocol distribution and a breakdown of errors.

(Note: An expanded version of this methodology, with detailed information about our test, appears on Network World Fusion.)

CONFIGURATION FOR THROUGHPUT TESTING


HP Internet Advisor
FDDI
Router under test
FDDI
Wandel & Goltermann DA-30c
100Base-T
100Base-T
Ethernet highway
UB Networks GeoRim switch
3Com LinkSwitch 3000 100Base-T switch
Ethernet highway
Fore Systems/ Alantec PowerBits

Concurrent loads delivered
FDDI=100,000 packet/sec
100Base-T=90,000 packet/sec
Ethernet=45,000 packet/sec

If it sounds like the RMON/Visualyzer and the Web interface are cool new toys that don't quite fit in with Cisco's more traditional management wares — CiscoWorks, and the newer and overlapping CiscoView — well, that's pretty much our assessment. Clearly, CiscoView is intended to provide a common management interface for Cisco routers and the product lines of all of Cisco's recently acquired lines of business (such as LAN switches and ATM switches). But from our evaluation, CiscoView, which provides only a real-time interface to a managed router, lacks a lot of the functionality contained in CiscoWorks, such as router software management. From a configuration and installation point of view, the Cisco 7200 fared about as well as Bay's BCN or 3Com's NetBuilder.

3Com Corp.'s *NetBuilder II*

As new as the 7200 is, Cisco isn't yet shipping ATM or ISDN adapters for it, but plans for both to be available by year-end.

The densest module in the router is the eight-port Ethernet, which lets users configure the router for as many as 48 Ethernet interfaces. At the high-speed LAN end, though, the 7200 can support no more than a half-dozen FDDI or 100Base-T interfaces. This is likely due to the throughput of the system rather than the limited number of slots or ports-per-module density.

In fact, three or four FDDI or 100-Base-T interfaces, if heavily loaded with traffic headed for the router, could inundate the 7200. We observed the router forward a little more than 100,000 packet/sec — or about 44% of the maximum load we attempted in our throughput tests.

In our estimation, the Cisco 7200 distinguished itself most in the categories of special and advanced features, and management and administration. The high management and administration rating stems from the breadth of management applications, interfaces and capabilities supported by the 7200. Of course, some users are likely to see this broad repertoire of overlapping applications and interfaces as a hodgepodge. We can't completely disagree with that view. We hope Cisco is working to better organize its impressive management tool kit.

In the realm of special and advanced features, Cisco exhibited its software prowess in areas such as protocol prioritization, hot-standby response to down and overloaded links, compression capabilities and security features. And it's clear that a number of other new features are expected out soon: Cisco says the next software release due later this year, 11.2, will add firewall-type network address translation and virtual LAN features, among other things. So the good news is that Cisco's software is more chock-full of useful advanced features than either Bay or 3Com. The bad news is that, currently, most of these can be accessed, configured and implemented only via Cisco's arduous command-line interface.

Easy-to-use NetBuilder II

3Com's high-end router, the NetBuilder II, is a solid and stable routing platform, with good management capabilities. But competitor Cisco unquestionably has the richest and most extensive software features and capabilities, while Bay undoubtedly has the greatest capacity and throughput performance.

With the same configuration and delivered load we used with Cisco and Bay, we found the NetBuilder II could forward slightly more than 66,000 packet/sec, placing it well behind the other two. In its maximum configuration, the router supports no more than two FDDI-DAS interfaces (even though four of the double-slot FDDI modules could physically be configured in the eight-slot router chassis). And while as many as eight concurrent 100Base-T interfaces are technically supported, it's likely that only two or three could overwhelm the NetBuilder II if each was delivering even a modest traffic load to the router.

For installation and configuration, 3Com was as good as Cisco and Bay. The NetBuilder II's command-line interface is a bit easier to use than either Cisco's or Bay's, and this, coupled with the best on-screen help, contributed to 3Com's top score in the ease-of-use category.

3Com's primary application for managing the NetBuilder II, Transcend Enterprise Manager for Unix, is consistent, clean and easy to use. That was not the case with either Cisco's or Bay's.

As far as effectiveness of router management, though, we found Transcend puzzling and lacking in a few respects. For example, the status and statistics displays all make a distinction between paths and ports, which we could not understand. Data elements in both categories seemed to overlap, and both path and port appeared tied to a particular physical interface on the router. Still, it was annoying to have to choose between the two to find a particular item of management

See **Routers,** *page 41*

ONLINE

For expanded details of our test methodology, link to Network World Fusion. Select NetRef, Buyer's Guides and Reviews, then High-End Routers.

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Feature

Whole new game

Even before telecom players know the rules, they are moving to offer you one service under one bill – one of these days.

By Melodie Reagan

When the clock strikes midnight Jan. 1, 1997, a mix of players in a more deregulated telecommunications arena will be ready to play a new market game, one of increased competition that brings more options for you.

Forget that the game rules are not quite finalized. Carriers with different backgrounds are formulating strategies and rolling the dice ahead of time, hoping they'll be ready to make quick advances when the real competition promised by the Telecommunications Reform Act of 1996 begins.

Interexchange carriers (IXC) are moving into the local loop. IXCs along with the regional Bell operating companies are nudging their way into cable TV. RBOCs plan to give IXCs a run for their money in the long-distance market. Cable TV companies are diverting their attention away from one-way entertainment and information services and toward local and long-distance phone service. Then there's the competitive access providers (CAP) that continue a big push into the long-distance and local phone service market. All the various players are also pushing the technological envelope by dabbling in personal communications services (PCS) and mobile communications.

So the big question is: Who's going to win the game?

At the start

All the players will come out of the gate exhibiting branding wizardry. In essence, they will push a bundle of goods, some of which they have never offered before.

However, as you hear out their sales pitches, beware of the all-in-one package the account manager touts as your communications panacea (see graphic, page 40). Often, the initial package will be little more than pieces of various services that have been pasted together until the real thing comes along. Some of the pieces will be homegrown, and others resold services acquired from partners. The mix will depend on who the providers are, the geographic areas they serve and what the regulators say they can and cannot do.

For example, the IXCs, CAPs and cable TV companies today aren't allowed to offer local service in all states. In states where it is permitted, the RBOCs aren't always required to play along with the competition. Conversely, the

ILLUSTRATION BY ELLIOTT PARK

RBOCs are not allowed to offer long-distance within their regions. In 1997, these boundaries will drop, and competition will become wide open in both the local and long-distance arenas.

As the game board is laid out today, players looking to expand their product offerings have to build or improve their own networks, or buy one by acquiring and merging with other players, which is not always a good choice. Despite what you may think, the buy option delays time to market, costs tons of money and takes precious time to put in place. However, the companies that begin playing the field now will no doubt be the high scorers in the days to come.

The buy decision can also confuse the customer service picture, especially when the provider is not in full control of the network and all aspects of service delivery.

In addition, providers are restricted at key handshake points with their counterparts. Service delivery components such as installation intervals, billing, call completion and trouble resolution could get worse — a lot worse — as carriers work to integrate disparate networks and customer-care systems.

Some questions to ask in the new game

When evaluating and implementing new service options in the new telecommunications market, ask providers these tough questions up front.

- What are your service-level agreements? What happens if you breach them?
- How long before my packaged local, long-distance, cable, Internet, wireless service is fully turned up? What if I want to change my service configuration or the package I'm using?
- What does your end-to-end service include? Do you provide inside wiring, CPE, professional services, and 24-hour-a-day service and support?
- What service and product components are you reselling? Do the same service-level agreements apply to resold services? If you do not use your own network, how can you guarantee call completion and quality? How will you handle problems when they occur?
- How many bills will I receive? Can I get volume discounts for all service elements in the new package? How will I benefit from higher usage of all elements of the package?
- Can I keep my telephone number? Will Calling Line ID services work correctly?
- How many telephone numbers must I call for queries and troubles?

RBOCs control the board for now

So what can you expect from the major players?

The RBOCs will continue to crow because they will still reap strong revenues by charging competitors for switched and dedicated access to their local loops. Even with a recent Federal Communications Commission ruling to cut switched access fees, the RBOCs will still get that money until competitors can build their own local nets.

The competition is kicking into high gear, too. The IXCs are working to originate and terminate calls end-to-end on their own networks. They are also driving traffic to dedicated access facilities, thus bypassing the local switched network, and forging relationships with CAPs. Once they have local-loop options in place, it will take a long time for the IXCs to forgive and forget the more than 40% of revenues they've had to pay RBOCs for each minute of use.

The CAPs, which are becoming known now as competitive local exchange carriers, are in an enviable position to pressure the RBOCs. CAPs have a solid presence in major metropolitan areas with state-of-the-art networks. Being locally based companies, they have forged tight relationships with their customers and the cities they serve.

The CAPs have their own local networks that use fiber and ATM technologies, they have solid business customer bases and a strong local presence. They are uniquely positioned to immediately drive end-to-end competition in the local loop, whether on a wholesale or retail basis.

Cable TV firms have powerful local networks, too, although many of them need enhancements to adequately support two-way communications. These companies can also fund growth from the deep pockets acquired from their monopoly position in delivering entertainment to the home.

Cable TV-based telephony services could become some of the most interesting packages on the market, offering bundled dial tone, long distance and cable TV for one price, and all on the same bill. That will be great for residential consumers but not for businesses, unless your people watch a lot of TV at the office. Penetrating the business market falls well below the priority of capturing residential customers for cable TV providers. So, although it will be coming, don't expect much from cable TV firms any time soon.

All that said, competition is alive and well, as are regulatory pressures, and the RBOCs will respond with lower access rates for both switched and dedicated services.

''We are trying to be as proactive as possible to lower rates,'' says Ron Lataille, director of access services at Bell Atlantic Corp. It's already happening. Bell Atlantic is offering a rate of 2.05 cents per minute for interstate switched access, and Pacific Bell is offering intrastate switched access for 1.4 cents per minute. It doesn't seem long ago that switched access averaged around 5 cents per minute.

''Rates will go down for switched access first, then dedicated access,'' says Ken Rust, NYNEX Corp.'s director of federal regulatory matters. ''With switched access rates falling, dedicated access will become less attractive.''

One problem though: Don't expect the IXCs to directly give up any of this newfound cash. The money that once lined the RBOCs' pockets will now be used by the IXCs to expand their service offerings and market coverage instead of lowering long-distance rates.

Pass go and collect what?

Once the providers have passed the go marker, you can expect to get more products and services. ''By the year 2000, 50% of our revenues will come from new lines of business or new services,'' says Robert Stewart, director of public policy communications at MCI Communications Corp.

So expect a bevy of more attractive choices in pricing packages for local service. Look for more bundled offerings, one price for a cache of goodies. As an example, you may be able to get a telephone line with the top five custom local-area signaling services (CLASS) features for a flat monthly fee of under $25. It's already offered by some CAPs.

''Competition in long distance has driven rates down by 66% since 1984,'' says Gary Owen, vice president of integrated services at Sprint Corp. ''No doubt customers will benefit from competition in local services, too.'' And where you can get a single end-to-end service, you can expect discounts that recognize, with varying flexibility, the total business you do with that carrier.

''Customers will receive more choice, more products and services, and lower prices,'' says David Rush, information director for global data services at AT&T. With the barriers between local and long-distance falling, a local access and transport area no longer has meaning. Intra-LATA toll charges will fade into oblivion, and Intra-LATA foreign exchange (FX) service will be eroded by newly defined calling zones. Look for expanded local calling areas and reduced rates for what was once toll or FX service.

''We are trying to get away from nickel-and-diming customers,'' says Steve Grossmann, director of local services at MFS Communications Company, Inc. For example, at MFS, inward, outward and combination PBX trunks are offered at the same rate.

The new entrants will drive toward simplicity, offering single-rate services, including flat monthly fees, flat rates per call and no-charge features. As competition increases, prices that are artificially inflated will be squeezed to more closely reflect true costs. You can expect as a business customer to receive lower cost local services, including dial tone, Centrex, PBX trunks and ISDN.

In this new environment, ISDN orders will escalate. After spending the past five years upgrading their networks, the RBOCs will finally offer almost ubiquitous service. Plus, many of the CAPs that are implementing new local switching platforms intend to use ISDN as their flagship product. Why? With their new platforms, it's software-driven and as easy to deploy as dial tone.

ISDN will also benefit as the lust for online content and bandwidth continue to increase. ISDN is the next step for even casual online service users who have morphed into frenzied, frothing-at-the mouth bandwidth consumers. And,

How the Big Three will break into local market

While they wait for the competitive local exchange market to open for business, the interexchange carriers (IXC) are posturing to provide end-to-end national service to business and residential customers.

Their first line of attack will be to resell local service from the regional Bell operating companies. A benefit of that is you can change carriers with no interruption in service because you continue using the same facility. Furthermore, you keep your existing telephone number.

On the downside, the IXCs will be restricted to the service and functionality offered by the RBOCs until they can expand their methods of service delivery.

Here's what else the Big Three have in mind:

■ **AT&T** plans to offer local service nationwide using a combination of agreements with competitive access providers (CAP), resale of CAP and RBOC services, and the construction or acquisition of facilities in selective markets. AT&T will offer service packages that could include local, long-distance and wireless services, in addition to its WorldNet and satellite television services.

■ **MCI Communications Corp.'s** local service deployment strategy is fourfold: Resell RBOC services; lease pieces of the local loop; partner with other providers to construct local-loop networks; and build its own local-loop network via its MetroMCI program.

MCI currently offers local service in 10 markets and plans to expand to 24 by year-end. It recently rolled out MCIOne, a first-of-breed integrated package that includes long-distance, calling-card, paging, cellular, Internet access and voice mail services all covered by one bill and one service number. Plus, customers receive free long distance with their cellular service. MCI plans to sell PCs, home security and local access services under the MCIOne package.

■ **Sprint Corp.** will offer dial-tone service with custom local area signaling services (CLASS) to begin with, and over time add services such as wireless. Sprint's intention is to build on the strength of its current local business with more than 7 million customers.

The deployment strategy is to resell local services, lease pieces of the local loop, and build its own network. Recently rated by JD Powers and Associates as offering the ''best customer service,'' odds are Sprint will make every effort to continue to give customers service they can count on.

— Melodie Reagan

importantly, carriers can and will offer it at a significantly reduced price, bringing it in line with the cost of a standard business line. Ultimately, however, technologies such as Asymmetric Digital Subscriber Line will be needed to satiate the appetite merely whetted by ISDN.

Go to jail, do not pass go

It is interesting to note that although more products and services will be brought to market, their functionality will remain relatively unchanged. And although bundling is the wave of the future, it's important to ask just how far it will go.

Check out Network World Fusion to to get another perspective on what'll happen in the wake of telecom reform.

NetworkWorld Fusion
http://www.nwfusion.com

Many carriers expanding their product lines to include local services don't want to bother with equipment, and some are taking a hands-off stance with regard to inside wiring. Therefore, changing service providers could result in having more of them to deal with — one for long distance, one for local dial tone, one for inside wiring and one for equipment.

The next-generation carrier will integrate all services and provide seamless, end-to-end service delivery. After all, customers still will look for price, performance and ease of use.

But will they get it? Overall service and billing will be affected, adversely at first if providers hurry their packaging just to get to market. Yes, packaging is important to grab market share, but worse would be to lose a customer due to dismal service and poor billing.

Telecom reform is not limited to the U.S. — more competition is in store in Europe as well. Page 42.

To really compete, the providers — with the exclusion of the Big Three IXCs — will have to usher in the next generation of service delivery systems that includes billing, customer reception and customer maintenance. Face it: Although the RBOCs, CAPs and cable TV companies are working furtively to have billing solutions ready for Jan. 1, few of them will be the equal of the IXCs on Day One.

The IXCs have the advantage here because they know what it means to get it wrong. They've been there and have done just that. The CAPs have been concerned primarily with flat-rate access arrangements, and most are not prepared for usage-sensitive rates, let alone for the sophisticated pricing and discounting schemes supported by Sprint's Invoice Processing System billing system.

With their monopoly position, the RBOCs have only had to please the regulators, not their customers. They have a long way to travel before they have the abilities of the IXCs. The cable TV firms have the least favorable service reputation, which pretty much means things can only get better.

All swords in this game are double-edged, and this restriction in systems will drive simplicity of price. Today, a Centrex service from an RBOC can easily result in over 10 different charges on your monthly bill. As we are all painfully aware, in part driven by regulatory requirements, RBOC pricing has been by piece part. You pay separately for the common line, the network access and add-on services, including hunting/rollover; three-way conference calling; call forwarding; call pick up; call transfer; and interstate toll access. The IXCs, CAPs or cable TV companies may get that down to around two charges; one for the line and one for the hunting/rollover service, which automatically routes an incoming call to another number when the number called is busy.

With this all-in-one packaging and one bill, sticker shock may leave you catatonic when the price tags are laid out. But there are more benefits than negatives to getting one bill. Considering that carriers will be able to give you discounts on all of the business you bring them, you'll be able to deal with fewer service providers and you may not need all of the services you currently use.

Today, you may have separate T-1s for your local and long-distance service. Tomorrow, capacity requirements will drive the number of T-1s you have, not the distance of the calls or the number of providers.

And if sticker shock is not bad enough, the end of residential subsidies will soon be squatting on top of hefty package fees. As competition drives prices to cover the real cost of service, the subsidy businesses have been paying for residential services in terms of higher prices will diminish. This could lead to (can you bear to hear it) price cuts for business users.

Don't expect anything significant until the smoke has settled after several major skirmishes on this subject. The disposition of the Universal Services Fund will affect whether residential rates will go up, and it'll be debated well into 1997.

The bottom line is to be cautious about changing the status quo. If different bills and different customer service telephone numbers for long distance and local service are OK, don't hurry to change unless the nouveau packager can lay all service concerns to rest.

In the meantime, prepare to shop by organizing your communications requirements. We are going back to the future where a single provider does it all. This time around though, the provider will do more for less — less price, that is.

THE SCORECARD

Any way you cut it, the new telecommunications market game will be a match of formidable opponents. Here's a breakdown of the players:

	Strengths	Weaknesses
IXCs	▲ Extensive experience in a competitive environment ▲ National brand equity ▲ Some of the best service delivery systems	▼ Don't have a local network ▼ Market focus and operations have been national, while new environment requires local look and feel
RBOCs	▲ Deep pockets – able to fund new business ventures ▲ Incumbent local service provider ▲ Generally have a reputation for providing quality service ▲ Most experienced in wireless services	▼ Having enjoyed a monopoly, they have little competitive experience ▼ Restricted from offering long-distance in region until they have met a 14-point certification ▼ Have outdated network and service delivery systems ▼ Don't have out-of-region network
CAPs	▲ Have state-of-the-art networks and strong presence in major metropolitan areas ▲ Highly competitive and fleet of foot ▲ Attractive investment opportunity; if public, they don't have to be self-funding ▲ Generally solid customer loyalty	▼ Current product set is limited, which means they have significant expansion requirements ▼ For most, the service delivery processes and systems currently don't support usage-based services ▼ Have small customer bases
Cable TV companies	▲ Have the greatest access to the home next to the RBOCs ▲ Have the most experience in cable services and content development	▼ Network infrastructure only supports one-way communications ▼ Reputation for poor service ▼ Don't have telecommunications experience ▼ Have severely limited distribution channels

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Routers

Continued from page 38

information when the distinction seemed to be an arbitrary one.

Management of the NetBuilder II continued in this good news/bad news vein. For example, configuration management was excellent — especially with a feature for baselining. This is where a particular router's configuration and operating software version and parameters can be designated as the baseline model for all the routers in the network. The others are compared against the baseline, discrepancies are noted and any router that's out of spec can be easily upgraded or otherwise modified.

On the other hand, traffic reporting was limited. There's no breakdown of packet errors or high-level protocols, nor are there any overall, router-level traffic statistics. There's also no way within Transcend to conduct long-term monitoring (in the background), with data collected for capacity planning or trend analysis.

In more cases than not, we had to question the veracity of the counts and percentages shown in most of the statistics displays. We observed what we conclude are timing problems in the way Transcend reconciles its polling of the router's SNMP agent with the delta values retrieved from the agent.

For example, a constant delivery of 160 unicast packets per second to the router was displayed as zero traffic for 5 minutes, followed by a large burst of traffic for a few seconds (4,500 packet/sec), followed again by zero traffic. Similarly, the reported data showing bytes per second of traffic was way off; it should have been a constant amount, but instead fluctuated erratically.

Another displayed value, showing the rate of errors, reported about two-thirds the actual rate of errored packets being delivered to a router interface. Also, the management application shows traffic on WAN links as an even split in both directions of total traffic, when in fact there was more traffic passing in one direction than in the other.

From an operational perspective, though, the NetBuilder II worked flawlessly. All the same major protocols routed by Cisco and Bay are also supported by 3Com in the NetBuilder II, along with roughly equivalent capabilities for bridging and encapsulation of non-routable packets (LAT, SNA, NETBEUI, translational bridging, Data Link Switching and so on).

Tied for first

Given our methodology and grading system, Cisco and Bay ended up in a tie for the top.

That doesn't imply that Cisco's and Bay's routers are identical, or even equivalent. If throughput is your top priority, Bay's BCN definitely beats the competition. If you attach more importance to advanced features such as those found with the Cisco 7200, then Cisco has the edge. In general, though, all three products showed they could do the job.

NetworkWorld TEST ALLIANCE

The alliance is a co-operative of users, consultants, educators and integrators that applies its technical and business skills to analyze and compare strategic network products. A list of alliance partners can be found on page 33.

Mier is president of Mier Communications, Inc., a Princeton Junction, N.J.-based network consultancy, product test center and technical publisher. He can be reached via E-mail at ed@mier.com or by phone at (609) 275-7311.

Management Strategies

Covering: Career Insights and Innovations
in Managing Staff, Budgets and Technology

Briefs

EDS Corp. *and its subsidiary,* **A.T. Kearney, Inc.,** *recently formed a service that gives clients of either firm access to an integrated team of technical experts and management consultants. Under the service, EDS clients will be able to tap A.T. Kearney management consultants and vice versa. For instance, an EDS client can match client/server programmers from EDS with business process designers from A.T. Kearney when building new applications.*

The integrated team can be deployed from more than 10 locations in the Americas, Europe and Asia to either company's clients based anywhere in the world.

A.T. Kearney: (214) 605-0081.

Gartner Group, Inc. *recently completed its acquisition of two training companies. Gartner purchased J3 Learning Corp. and Mindware Training Technologies, Ltd. Products. Both of the acquired companies will be folded into the Gartner organization and their offerings will be marketed under the brand name* **Gartner Group Learning.**

Gartner Group: (203) 964-0096.

The **Network Professional Association (NPA) users group** *last week decided to spin off its* **Certified Network Professional (CNP)** *program into a separate organization.*

The move puts the CNP program in a good position to apply to the National Commission for Certifying Agencies to become an approved certification program. Since the program's inception in October 1995, 83 network professionals have obtained the CNP designation. Another 47 are in the process of becoming CNPs.

CNPs must have a minimum of two approved areas of specialty, pass the core fundamentals exam, have 24 months of qualified networking experience, and agree to the CNP Code of Ethics.

For more information about the CNP program, call (801) 379-0330, Ext. 284.

Competitive landscape is emerging across the pond

Keep Europe in mind as you watch deregulation take hold in U.S. local markets.

By James Carlini

In rushing to figure out how the opening up of local carrier markets in the U.S. affects your international network, don't overlook the fact that Europe will soon be in the throes of similar deregulation.

By January 1998, many existing telephone companies offering monopoly services in European Union (EU) countries will be privatized, and new ventures will be able to start competing with them.

The EU and the Communications and Competition Directorates General of the European Commission are driving this deregulation. Large multinational companies are also pushing governments and regulatory agencies to create a more open European environment.

COUNTRIES WITH EXEMPTIONS

The European Union gave member countries Greece, Ireland, Portugal and Spain until 2003 to comply with deregulation. However, these countries have expressed a desire to meet the 1998 deadline.

Monopoly services in Europe include access to local telephone networks. Most other network services, such as frame relay, virtual networks and managed bandwidth, are considered value-added and are already being offered on a competitive basis in a lot of the countries.

What you'll face

There are several major issues you should be prepared to deal with in taking advantage of local carrier deregulation in European markets. For example, some participants, including European carriers, fear there might be labor problems when state-run telephone companies are privatized.

Furthermore, your carrier may already be very slow to respond to network problems. This could get worse if that carrier is forced to focus more attention on upgrading its network to compete or on dealing with labor problems.

So, if you're looking to establish a call center, a network management center or some other hub site in the deregulated European market, it's worthwhile to understand some nontechnical issues.

For one, be sure that your organization is in a position to take advantage of the financial incentive packages that some countries will offer. Depending on the country, you'll see tax incentives, grants for employee training programs and other financial enticements.

Another major issue to deal with is the spread of major international alliances. Today, several alliances compete with the post, telegraph and telephone administrations in countries where it is already allowed. Those alliances include AT&T-Unisource services, which is made up of AT&T Europe and the Unisource alliance of PTT Telecom Netherlands, Telia of Sweden, Swiss Telecom, and Telefonica of Spain; Concert, which comprises British Telecom and MCI Communications Corp.; and Global One, which is a team of Sprint Corp., Deutsche Telecom and France Telecom.

You may also want to examine how deregulation affected Great Britain, which privatized its government-run telephone company 10 years ago.

British Telecom was created as a result. The effort has put British Telecom ahead of most other European telephone companies in understanding competitive markets. Consider that the rates in Great Britain dropped more than 300% since privatization.

Germany and France, on the other hand, are just now deciding to privatize. Those countries have the highest rates in Europe. There are also looming strike issues in France. If the government decides to turn over the state-run telephone company to a privately held corporation, labor may resist.

Labor problems are a major reason why you should not sign a contract for more than one year—but there are others, as well.

There are just too many new offerings from state-run companies, and many of the competitive services are only starting to appear.

Locking into a long-term commitment of three to five years might save you some money initially but may also prevent you from taking advantage of new services as they appear.

Hub site (re)selection time

Still, this is a good time to decide where you might want to locate or relocate a European hub.

As part of the process, be ready to negotiate tax incentives as you consolidate internal network management and carrier services from several countries into one. These negotiations must occur prior to developing the site, however.

Keys to your hub move

Here are a few important factors to consider when contemplating whether to regionalize telecommunications services in one country following deregulation:

- The strength and quality of the current PTT's infrastructure
- The attitude of the country's government toward deregulation
- The list of competitive suppliers for voice and data network services and how actively they will vie for business in the country

Depending on the type of hub or management center you want, you might be able to get huge tax incentives or givebacks, depending on how the project is structured and approached. For example, the Netherlands has some special incentives for call centers located in its country. Other countries offer similar packages.

Language skills are also an issue. Here again, each country brings something different to bear on the problem. The Dutch have the highest multilingual capabilities: More than 75% of the population are able to speak English, and 14% speak three or more languages.

Another factor in deciding where you locate a European hub is whether the country has a stable economy. Part of the economic equation deals with labor issues; for example, the Dutch have the lowest number of days lost to strikes out of the 15 EU countries.

As European deregulation looms, some companies are surveying their operations to decide whether to regionalize their hubs in one country instead of obtaining services on a country-by-country basis. Others are already developing their action plans.

What your company should ultimately do depends on your organization's international network strategy.

But remember this, if you have no strategy, you have no future. And with deregulation about to happen, now is a good time to start strategizing.

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Network World Fusion

(http://www.nwfusion.com)

Find out more about telecommunications deregulation in EU countries on Network World Fusion. Select Careers, then Telecom Reform in Europe for links to:

- **Recent happenings on the EU deregulation front**
- **An overview of Trans-European Networks**
- **Abstracts on European de-regulation by U.K. consultancy Analysys**

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Software Evaluation Engineers

Must have experience designing, developing, and debugging test procedures and suites for LAN adapters, repeaters, and/or switches. Knowledge of LANs and the ability to set up PC workstations and servers for NetWare, Win NT/95 and Windows for Workgroup environments required. Experience writing SW automation test scripts essential.

Software Engineer – UNIX Drivers

Develop and debug UNIX driver programs for both retail and OEM markets. Requires the ability to plan, design and debug driver software. Familiarity with device drivers in UNIX essential.

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Develop network interface boards throughout all design phases. Proven ability to design and develop board-level products, digital/analog design skills, and knowledge of data communications, including LANs, are required.

System Hardware Engineer

Requires ASIC, FPGA, VHDL and high speed digital design skills. Experience leading a team of engineers through the product development cycle a must. Design experience with LANs essential.

Sr. Human Factors Engineer

Be a key player in the development of our network management projects. Must be familiar with all phases of analysis and have strong PC skills.

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Requires experience managing a software evaluation, testing or QA organization. Knowledge of software evaluation techniques and quality methodology essential.

UNIX Software Evaluation Engineers

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Software Technician

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Marketing

Product Marketing Engineers

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- ➤ Technical Marketing Managers

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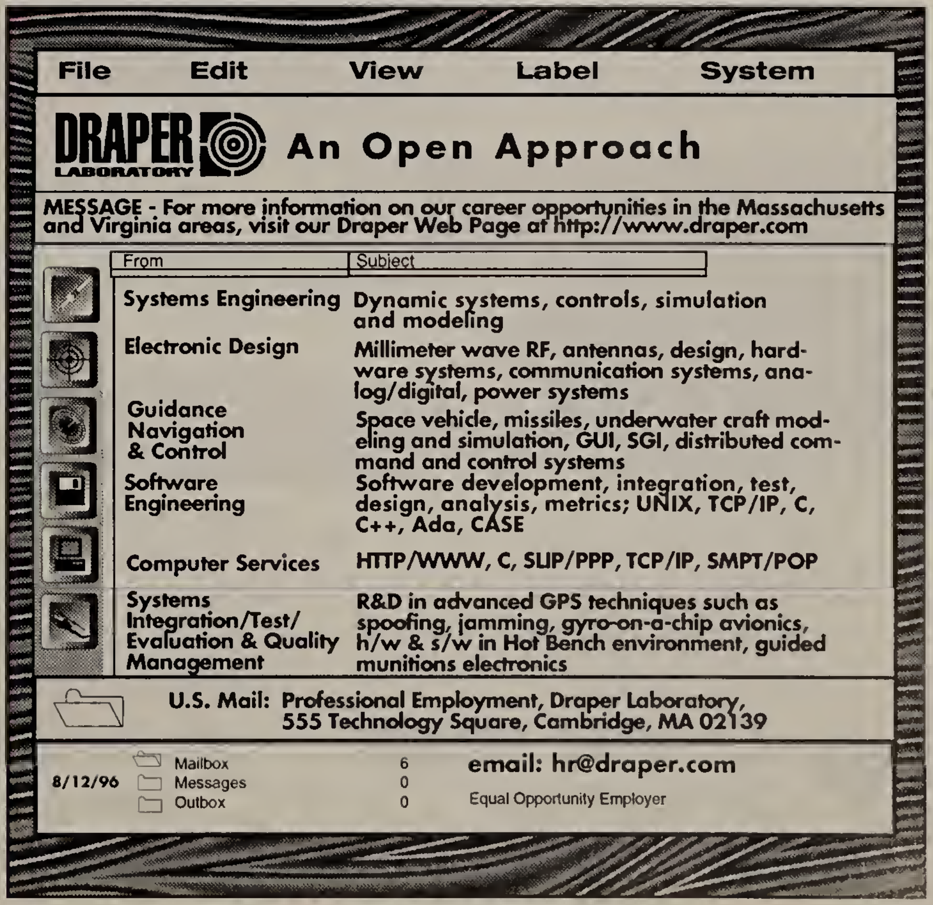

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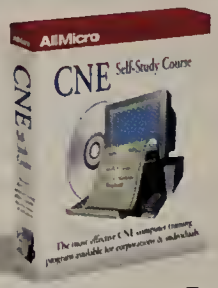

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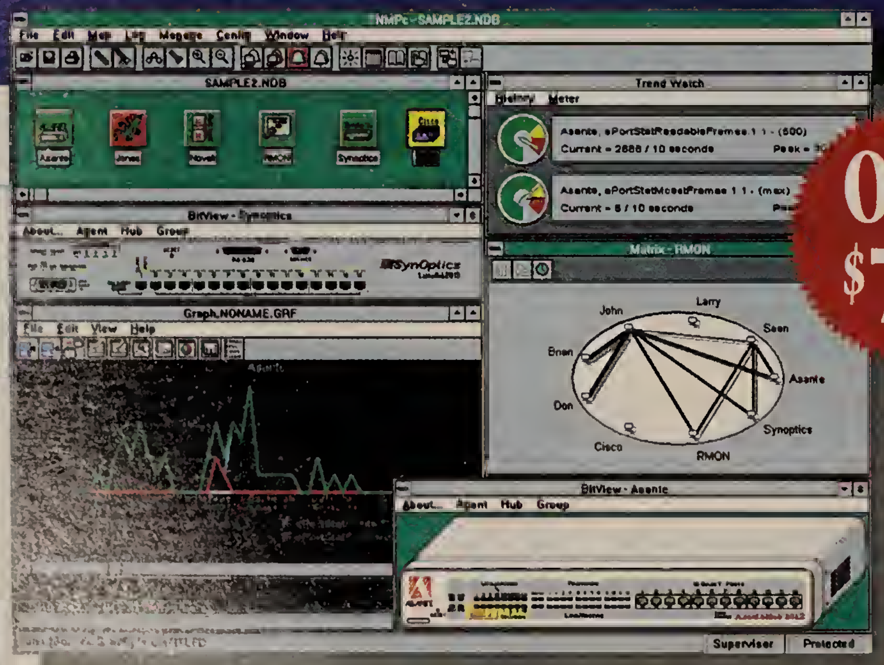

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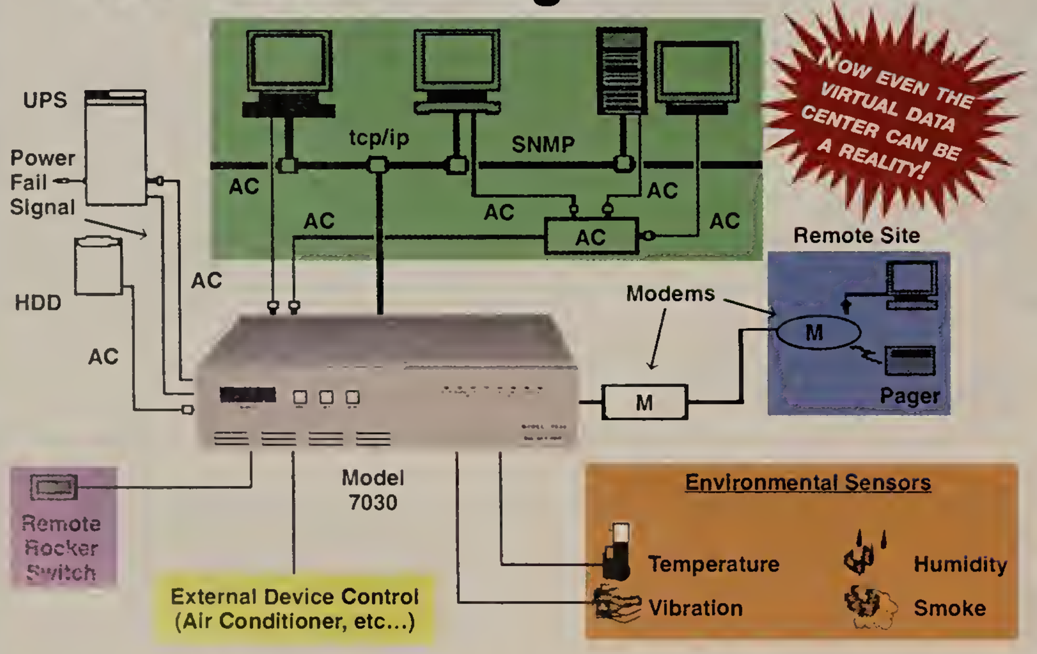

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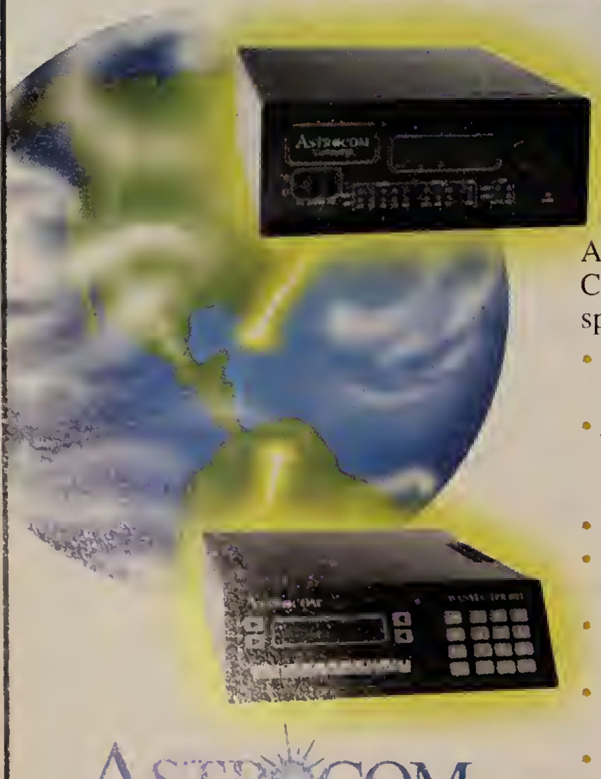

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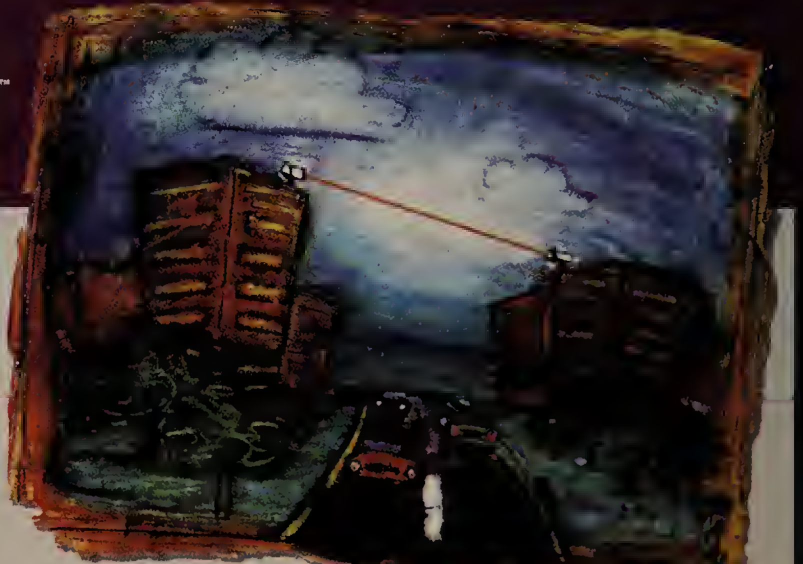

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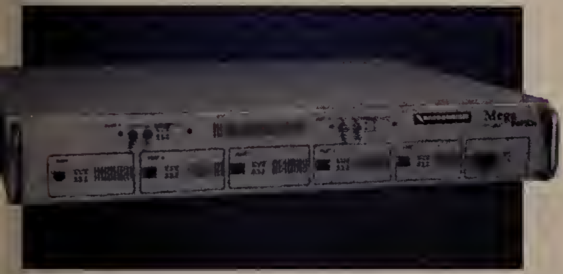

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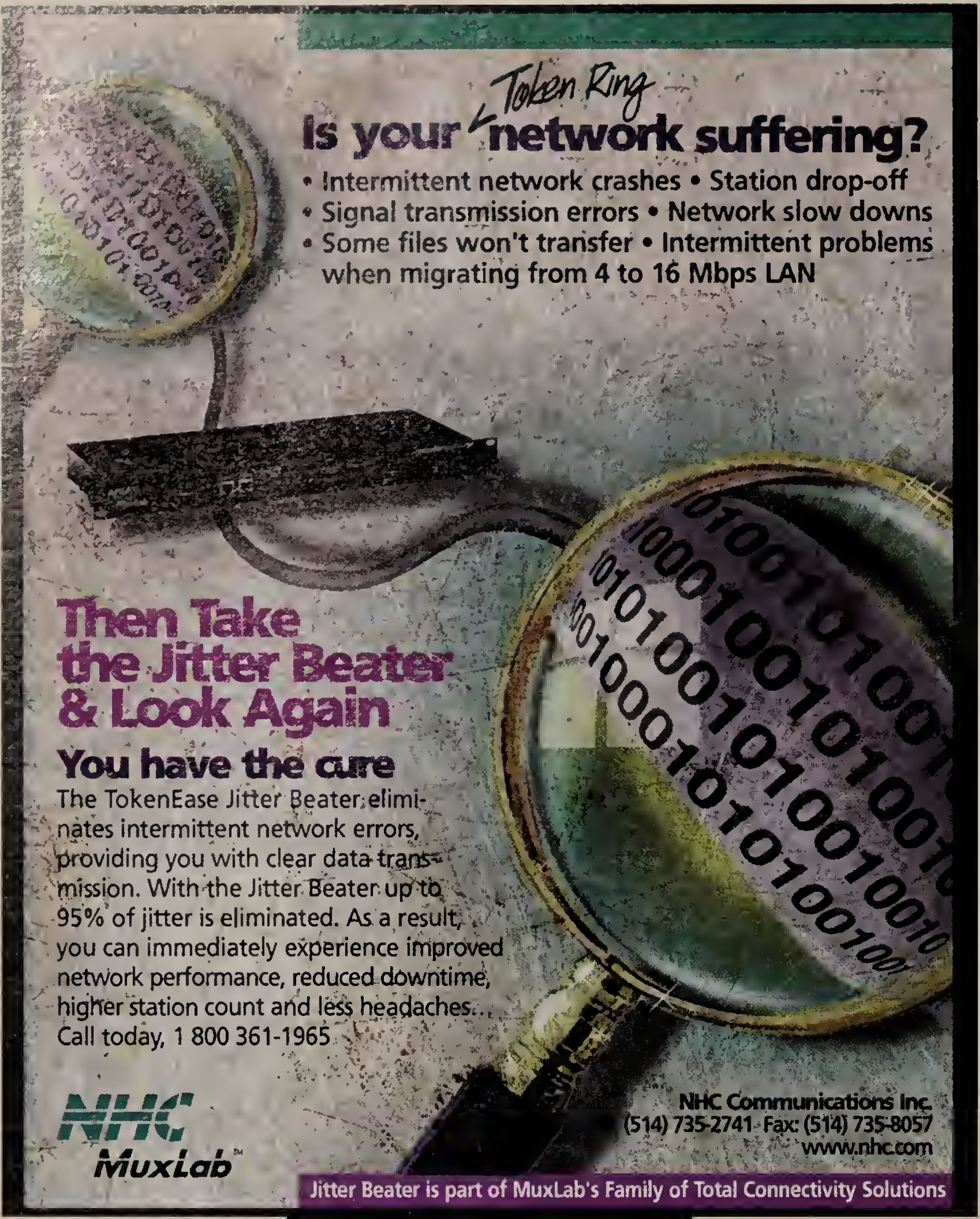

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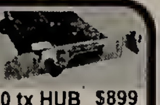

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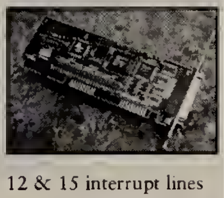

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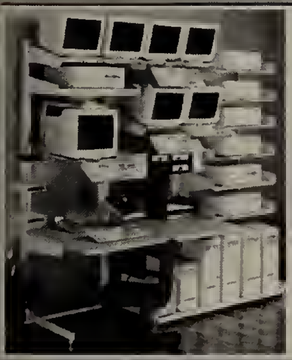

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FEP

Continued from page 6

in La Gaude, France, where the boxes are developed, IBM is filling in the holes and improving the performance of the FEP in a LAN environment across the board.

"We know SNA and APPN/HPR will continue to be the largest requirements for these boxes, but we want to be able to handle LAN and TCP/IP traffic just as efficiently," Garcia said.

"Fast Ethernet is what we are focused on mostly at this point, and we are looking to add support for T-3 speed links," Garcia added.

The new features will come in the form of adapter boards and drivers for the 3746-950 and 3746-900.

The 3746-950 is a stand-alone box designed to link downstream servers and communications devices to the mainframe, without requiring the Network Control Program of FEPs past. Currently, it does not support Ethernet or FDDI connections.

By November, the 3746-950 will support APPN, dependent LU Requester (dLUR) and Enterprise Systems Connection links to the mainframe; dLUR lets existing SNA devices communicate over APPN nets. It will support an assortment of TCP/IP routing protocol support, from Open Shortest Path First and the Routing Information Protocol to the Exterior Gateway Protocol by early next year, Garcia said.

The 3746-900 attaches to existing 3745 FEPs and provides them with additional line support as well as some increased LAN capacities. It supports traditional Ethernet links but not fast Ethernet or FDDI.

IBM has also promised several other improvements:

- A 155M bit/sec ATM adapter for the 3746-950 that will let servers, hubs and other ATM-enabled devices link to the mainframe.
- Support for APPN High Performance Routing so traffic will be able to flow over the ATM link, providing a high-speed pipe to the mainframe for next-generation APPN nets.
- Improved support for ISDN and X.25-based nets for the 3746-950.

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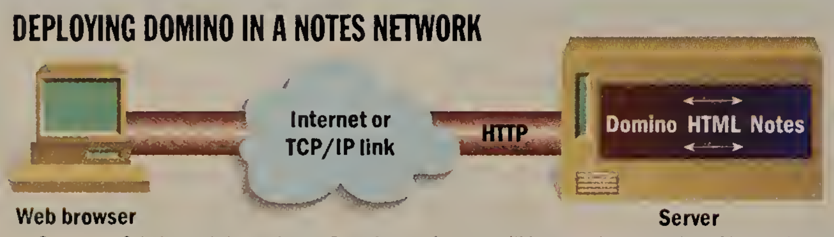
In-Site

Domino

Continued from page 1

tially halted deployment of pure Web servers. "Domino has clarified the picture."

Domino — a Notes/Web server hybrid that supports HTTP and translates documents between Notes and HTML on the fly — began shipping just two weeks ago. Coopers & Lybrand has been testing a beta version since early summer.



At Coopers & Lybrand, Lotus' new Domino software will be used to translate Notes data into HTML format and serve it up over HTTP to consultants using Web browsers.

The company currently runs a 300-server Notes network that serves 43,000 employees and clients worldwide for a variety of applications. Notes houses thousands of information repositories, discussion databases and all the firm's audit paperwork.

By adding Domino to an unspecified number of those servers, the company expects to be able to increase the number of employees and clients that can participate in collaborative applications and access data.

In addition, Coopers & Lybrand will be able to Webify existing Notes applications without incurring hefty data migration costs that would be involved in moving to traditional Web servers. The firm is also looking at how Domino might reduce long-distance bills by allowing consultants traveling overseas to dial in to a local Internet site to synch up their Notes databases.

Domino exploits Notes

Like its predecessor, Lotus' InterNotes Web Publisher, Domino will be used by Coopers & Lybrand to publish static information from the firm's Notes databases onto the Web. However, Domino goes further by exploiting Notes security, which Baren said will let Coopers & Lybrand make more data available on the Internet.

In addition to the general marketing information published for mass consumption, the company will add data that only its clients can access.

"Domino makes this possible because it lets you control who can access information at the document level," Baren said. "Coding that kind of security in HTML would require more work."

The firm will also use Domino to extend the reach of its online products, such as its Tax News Network, which can be accessed only via Notes clients. "A lot more of our clients have Web browsers [than Notes]," Baren said.

Domino may also be used to host Web-based collaborative discussions between employees or between employees and clients over the 'Net.

In addition, the firm is looking to use Domino to build survey applications to collect more detailed information on potential customers that visit its Web site.

The company has yet to port any of its Notes applications to Domino but has built some test ones to allow browser access to Notes databases. Rollout is imminent, despite the fact that Coopers & Lybrand is in the midst of a Notes Release 3-to-Release 4 conversion and is replacing its OS/2 servers with Windows NT.

Best of both worlds

Domino will give Coopers & Lybrand the best of both the Notes and Web worlds, Baren said. It lets the company take advantage of its Notes expertise without needing to acquire a lot of HTML and Java knowledge right away, he said.

From what the company has seen during beta tests, Domino installs quickly as a Notes add-in task. But some tweaking was required to make databases Domino-ready since some Notes functions — including certain advanced features in Release 4 — are not supported in the Web software.

Apple's PowerPC-based products behind schedule

By Sari Kalin
Boston

Apple Computer, Inc.'s top executive last week said PowerPC-based systems conforming to the Common Hardware Reference Platform (CHRP) will be delayed until the second half of next year. The system had been expected to be released by year-end.

Apple's *Amelio wants to emphasize its new technology.*

At the MacWorld Expo, held here last week, Apple Chairman and Chief Executive Officer Gilbert Amelio said the company is busy focusing research and development efforts in other areas, such as the Internet, object-oriented technologies and the new Copland version of its operating system.

"Do we need CHRP? Is it a major disaster if CHRP ships in August of next year vs. November of this year?

"It would be nice but. . .that is not as big a problem as shipping the next operating system software release, the next version of Cyberdog and working on OpenDoc," Amelio said.

During his keynote speech, Amelio said that, now that Apple's financial troubles have eased, he wants to emphasize bringing new technology from Apple's R&D labs to market in order to keep the Macintosh "an exciting and innovative" platform.

"We're clearly in transition, but right about this moment, we're transitioning from a dialogue that has centered on survival to a dialogue that centers on excitement, and it feels real good," Amelio said.

When asked if staff departures in engineering had caused delays in Apple's development schedule, Amelio said they had not.

He also stressed the need to increase the Macintosh's compatibility with Microsoft Corp.'s Windows, but said the company does not yet have an agreement with Microsoft to license Windows NT.

Kalin is a correspondent for IDG News Service's Boston bureau.

NetiQ

Continued from page 1

hodgepodge of third-party tools and homegrown utilities now used to keep BackOffice applications running.

Tom Kemp, NetiQ's director of products, said AppManager goes beyond the capabilities of NT's built-in Performance Monitor as well as the software distribution, remote control and inventory features of BackOffice's management component, Systems Management Server.

Tools such as AppManager are in demand because BackOffice — which consists of E-mail, systems management, database, Web and SNA connectivity applications — is so hot. Microsoft sold $1 billion worth of the BackOffice software during fiscal 1996 and could come close to doubling that in 1997, said Scott Reamer, a financial analyst at Bear, Stearns & Company, Inc. in New York.

> *"If [AppManager] would actually pulse and record that information into a retrievable database. . .that would be of great use," Judd's, Inc.'s Warren said.*

NetiQ will be one of the first companies to offer a full suite of BackOffice monitoring tools. But more seasoned companies such as BMC Software, Inc. and Compuware Corp. offer — or will offer by year-end — products that manage NT, SQL Server and Exchange Server as part of their systems management products.

Customers are ready to take a look.

"Right now, monitoring applications is a piecemeal process," said Alex Gaul, a systems consultant with George Westin Co., a Toronto-based holding company comprising 100 subsidiaries that use BackOffice. "We use NT's Performance Monitor when we're physically at the server setting up an app to see if it can take all the hits we want it to. But after that, we pretty much leave it alone unless a specific problem arises."

Richard Warren, vice president of information systems at Judd's, Inc., a magazine printing firm in Washington, D.C., is

Cisco

Continued from page 1

wiring-closet switch by the first quarter of 1996, and an FDDI uplink module for the Catalyst 1600 by September 1995.

The module and uplink are still not shipping. And Cisco's future token-ring switching products will not be based on Madge's RingRunner technology.

What went wrong?

The first indication that the Cisco/Madge partnership was dissolving came in April, when Cisco announced it would license token-ring technology from Olicom A/S (*NW,* April 8, page 20). At the time, both Cisco and Madge claimed there was no change to their arrangement, even though Cisco said future token-ring routing and switching products would be based on the Olicom design.

RINGING UP SOME BIG NUMBERS

The worldwide token-ring switching market will reach $278.5 million this year, a more than fivefold increase over 1995's revenue of $54.6 million, according to the Dell'Oro Group in Menlo Park, Calif.

Cisco struck the deal with Olicom because Madge, due to competitive issues, refused to carry the Cisco partnership beyond the OEM arrangement. And Cisco thought Madge's RingRunner licensing fees were too steep, said Cynthia Ringo, Madge's vice president of business development.

"We have some core technology there that we're not willing to just give away to Cisco to meet their business needs," she said. "If you're a very powerful player, many times you can just dictate, 'If you want to do business with me, you will do it the way I tell you to.' We won't be in business very long if our business is just to do what Cisco wants us to."

Cisco wanted to work with Madge to add features to the Catalyst 1600, such as address filtering, but no go.

"We tried several times to assist them, but we weren't able to get very far," said Randall Campbell, product line manager in Cisco's InterWorks business unit.

Cisco also needs a switch that supports source route transparent bridging, which the Catalyst 1600 does not. This could limit its appeal in Novell, Inc. NetWare environments.

Source route transparent bridging would help network administrators avoid the potentially nightmarish task of configuring each and every NetWare client with source route bridging.

The Nashoba Concord switch supports source route transparent bridging, as well as address filtering, RMON and an FDDI uplink.

Madge just recently began shipping an FDDI uplink on the Smart Ringswitch, and will offer the rest of these features later this month or in September, company insiders said.

Cisco will still offer the Catalyst 1600 and let the market decide between that and the Catalyst 1800. "Given the value-added functions of the Nashoba switch, people are going to opt for that," said Anura Guruge, an independent consultant in New Ipswich, N.H.

The token-ring switching module for the Catalyst 5000 will now start shipping with the Olicom technology in mid-1997, at least 15 months later than planned, Campbell said. Cisco accepts responsibility for the delay.

"The design was too complicated and too expensive," Campbell said.

"There's no doubt that we messed up on that," he said. ■

Where Nashoba fits in

Although its arrangement with Madge Networks, Inc. is less strategic than first touted, Cisco Systems, Inc. believes it will secure a long-term token-ring vision by purchasing Nashoba Networks, Inc.

Under the $100 million stock deal, Cisco will obtain Nashoba's Concord switch, an eight-port, store-and-forward device upgradable to 16 ports and suited for workgroup and backbone connectivity. Nashoba has shipped more than 600 of the devices.

The Concord switch will dovetail with some of Cisco's other token-ring switches and planned offerings. These include the Catalyst 2600 workgroup switch, and the Switched Access Unit (SAU) and token-ring switching modules for the Catalyst 5000 switch, which are due next year.

Observers expect Concord to eventually replace the Catalyst 1600, which Madge developed.

The Nashoba device can be a concentrator of switches such as the Catalyst 2600 and SAU while providing token-ring, FDDI or ATM links to the Catalyst 5000. The Concord switches can serve as front ends to Cisco routers in a backbone, adhering to the company's CiscoFusion architecture.

Perhaps more strategic than the switch, though, is the manpower behind it. Nashoba's 40 employees will become the token-ring switching division of Cisco's InterWorks business unit, and will be based in Chelmsford, Mass.

Nashoba's *Grewal*

Nick Grewal, president and chief executive officer of Nashoba, will become a Cisco vice president responsible for token-ring switching operations.

Grewal said an existing resale arrangement with Cisco rival Cabletron Systems, Inc. will be maintained and expanded.

Cabletron concurs.

"It's really just business as usual for us," said Bob Travis, product marketing and development manager for token-ring and SNA at Cabletron.

Cisco expects to complete the Nashoba transaction in about a month.

—Jodi Cohen and Jim Duffy

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interested in tracking the performance of BackOffice applications over time.

"If [AppManager] would actually pulse and record that information into a retrievable database that we could ask questions of on demand, that would be of great use," Warren said.

AppManager agents sit on Windows NT machines running any BackOffice component — except SNA Server — to track performance levels of those applications.

The agents then make that information available to net managers in a graphical format through a central repository, which is a SQL Server database, and notify them should either preset or customized thresholds be exceeded or availability be interrupted.

Administrators can be notified via an SNMP alert sent to a central AppManager console running on any Windows NT or Windows 95 workstation. Alerts can also be sent to management platforms such as Hewlett-Packard Co.'s OpenView.

AppManager will also track in-house applications developed with VisualBasic or OLE technology. In addition, developers can write VisualBasic scripts referred to by NetiQ as Knowledge Scripts to instruct agent software to initiate corrective action.

For example, should a SQL Server system go down, the agent software could be instructed to restart the application and notify the administrator via E-mail or pager.

Kurt Schlegel, a research analyst at META Group, Inc. in Stamford, Conn., said application management is a fast-growing segment of the systems management market. However, he questioned the attraction of a Microsoft-only platform.

"Not too many shops have gone whole hog with BackOffice. There is at least a Unix box in there and some other mission-critical applications running on NT. In either case, this product is not going to give you that centralized control of your distributed apps," Schlegel said.

Kemp said NetiQ will support more applications and operating systems in the future.

The versions of BackOffice components to be initially supported by AppManager will be Windows NT 3.51 and 4.0, SQL Server 6.0 and 6.5, SMS 1.1 and 1.2, Exchange Server 4.0 and Internet Information Server 1.0.

AppManager is in limited beta and expected to ship in the fourth quarter. Pricing starts at $1,000 and is based on the number of servers and applications managed.

©NetiQ: (408) 556-0888.

AN ALL-STAR LINEUP

The top five executives of NetiQ have amassed a total of 100 years of software development experience among them.

Ching-Fa Hwang	**Founder and CEO**	**Previous experience: Founder of EcoSystems, vice president of Compuware and developer of HP-UX at HP**
Her-Daw Che	Founder and vice president of engineering	Previous experience: Director of Engineering at Ecosystems and Unix developer at AT&T Bell Laboratories
Tom Kemp	Director of products	Previous experience: Director of product management for Compuware, head of field sales at Ecosystems and principal consultant with Oracle
Glenn Winokur	Director of sales	Previous experience: Vice president of North American field sales at Frame Technology (now Adobe) and director of federal sales at Ingres (now part of Computer Associates)
Dan Conde	Product manager	Previous experience: Product manager for Windows NT and program manager for Cairo project at Microsoft, and Unix developer at Digital Equipment

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USPS 735-730

To: All company staff
From: VP of MIS
Subject: The new order

Dear colleagues,

The MIS Group has had enough. We have tried for years to answer your questions (no matter how bizarre or irrelevant), fix your equipment (no matter how you abuse it) and correct your software problems (no matter how deranged your actions may have been).

We almost always smile and try to be kind, and never, ever swear (at least not until will get back to our offices).

But, ladies and gentlemen, MIS is going to change.

I've worked here for what seems like four or five millennia, seen CEOs and CFOs come and go, and, while my group's budget has hardly grown, I've watched demand for our services grow faster than the national debt.

One recent event finished it for me. The lines to the support center were loaded, so I picked up a call. It was a user down in accounts. He had a new PC with all the goodies and his cup holder was broken.

"Pardon?" I said.

"It's my cupholder; it doesn't work anymore."

"You don't have a cupholder on a computer," I hesitantly said.

"I do," he replied with the tone of one who knows he's caught you out. "It pops out of the front of my computer when I press the button below the slot."

I hung up the phone and began writing this memo.

The point is to announce that the world as you know it is going to change.

We cannot afford to support stupidity. We cannot afford to subsidize ignorance. And we certainly cannot afford to fix what should never have been broken in the first place.

The new rules will be:

1. If you break your PC, printer or other piece of IT equipment because you don't know how it works or don't take care of it, you will have to wait until the annual end-of-budget-year tidy-up to see if we can afford to repair it.

I can tell you in advance that you will probably be disappointed unless you are on the board of directors.

We cannot afford to support stupidity, subsidize ignorance or fix things that should not be broken.

This applies to broken "cup holders," floppy drives with multiple disks wedged into them, computers soaked in coffee, tea, orange juice or other beverage, and machines used for purposes other than IT (that incident in sales with the exploding toner cartridge is not forgotten, guys).

2. To ensure and control service quality, all support calls will be taped. If you ask a stupid question, we reserve the right to broadcast your call over the public address system. (Remember, we control the horizontal, we control the vertical, and we control the speaker system.)

3. To defray our service costs, we will be instituting a chargeback system. The following services will be charged for:

- ■ Restoring a file you trashed = 50 cents per incident.
- ■ Recovering from del *.* = $50 per incident.
- ■ Answering the question: "Where do I find the (any key)?" = $1 per call.
- ■ Rebuilding your account because you've forgotten your password = $10 per incident.
- ■ Installing that ridiculous piece of software you simply couldn't do your job without = $400. (This covers the costs of restoring your system when the lame program trashes your PC.)
- ■ Answering questions about applications that you could have answered yourself by reading the manuals we gave you, attending the training sessions we held or staying awake in the training sessions you did attend = $50 per question.

So there you have it: the new order. If you don't like it, please feel free to set up your own support and IT groups.

Best regards,

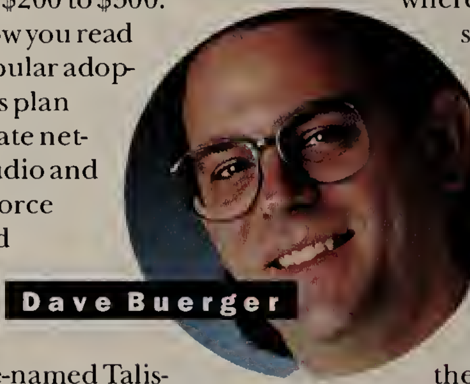
V.P., Management Information Services.

Gibbs is back on the road this week with his intranet seminars. Why hasn't he seen you at one? Let him know at mgibbs@gibbs.com or call him at (800) 622-1108, Ext. 504.

Microsoft's Talisman may force corporate 'Net upgrades

Change rarely comes without inconvenience, even if it's from worse to better. But orchestrating big change is always smoother when you have a good sense of the future.

Last week, Microsoft Corp. proposed a scheme to transform PCs into the rough equivalent of $50,000 workstations — for about $200 to $300. Depending on how you read the tea leaves, popular adoption of Microsoft's plan could jam corporate networks with new audio and video traffic and force major, widespread upgrades to faster transmission technology.



The idea, code-named Talisman, was detailed in a technical paper at the SIGGRAPH 96 trade show in New Orleans. The paper's descriptive title left no doubt how Microsoft will apply its research: "Talisman: Commodity Realtime 3D Graphics for the PC."

Talisman is an architecture that helps a conventional PC display quality graphics and full-motion video. The architecture includes custom microchips that boost the frame-per-second display rate to 60 or 70.

Talisman's display rate is about three times that of a standard PC and would rival performance of a high-end workstation.

This rate is about three times that of a standard PC and would rival performance of a high-end workstation. In simple terms, users would get the performance of a Silicon Graphics, Inc. workstation for about 10% of the cost.

You don't have to be a rocket scientist to grasp the potential of this idea. Entertainment products are an obvious beneficiary. But it would also enable desktop videoconferencing, video E-mail, computer-based training, access to video libraries and live television feeds, virtual reality simulations and a host of custom applications.

Most people prefer to experience life visually, not through words alone. Extending the power of video to our desktop work companion is a natural move. The low price makes it a no-brainer.

You are no doubt thinking, "Gee, today I have to worry about the effect a popular application like PointCast has on my network. Talisman will bring my network to its knees!"

Well, not so fast. Talisman, of course, is not real. It's still just an idea on paper, or wherever new ideas park themselves while in digital storage.

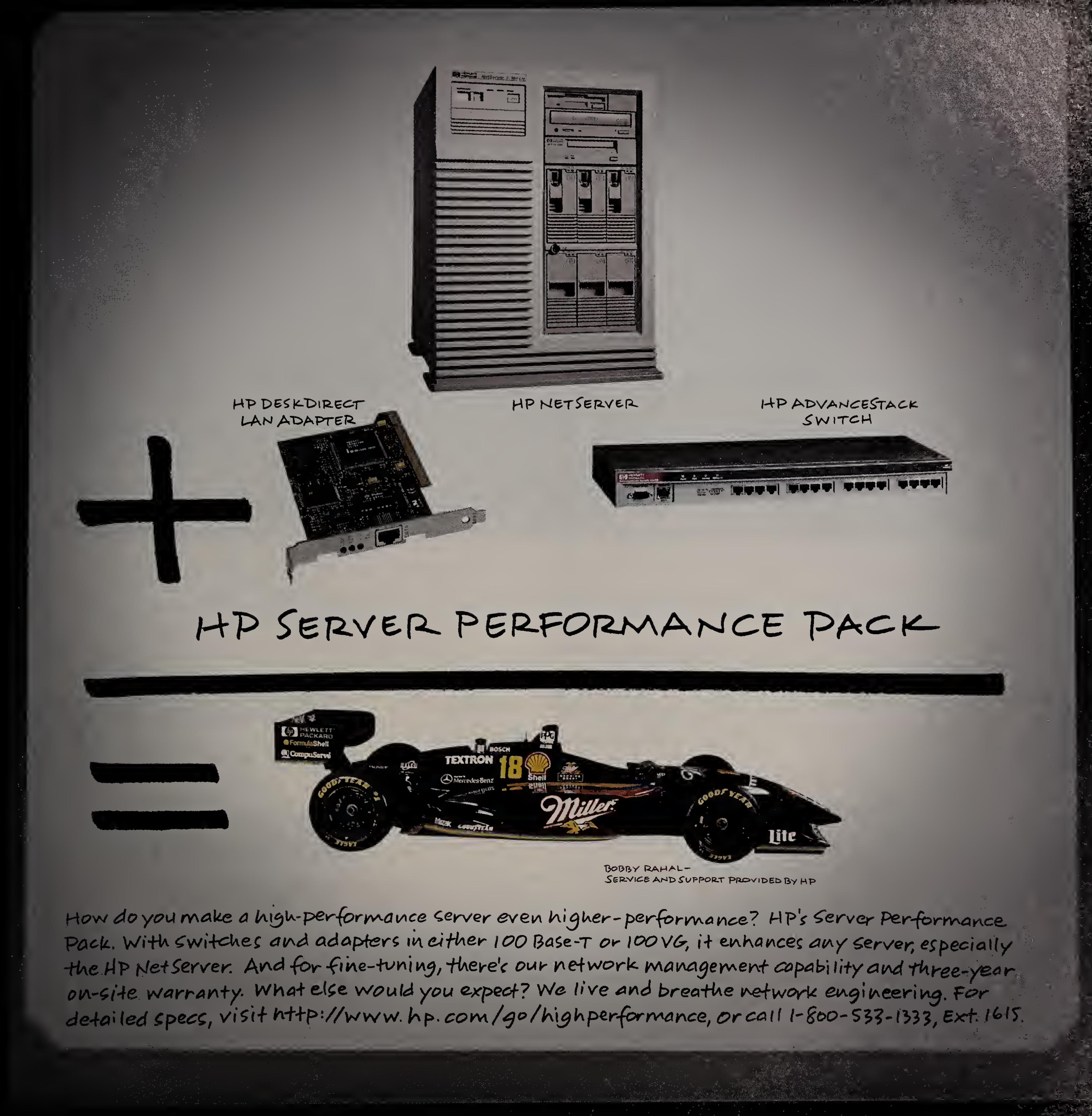
If it succeeds, corporate networks would definitely need a major face-lift. The operative word is "if."

Microsoft first has to recruit manufacturing partners because Talisman is rooted in silicon. Those partners then must agree on the specification, engineer the product, ensure interoperability, and produce the chip sets and/or circuit boards that people will buy. It is not clear if the product will work in existing PCs, but we presume it will. Word is that the first Talisman products will ship near the end of 1997. Microsoft has never designed chips, so this could be aggressive.

Similar plans for new chips that dramatically shrink the cost of doing special functions have run into various snags. Intel Corp., for instance, has just delayed the introduction of a new multimedia Pentium chip. The chip will boost the processing of audio and video by as much as four times. Rollout was supposed to be in December; it is now scheduled for the first quarter of 1997. This new chip based on MMX technology, actually grew from a plan in the early 1990s to produce a PC-based codec for $100. A codec, or coder/decoder, is the key element for videoconferencing gear. That price made the imagination soar. Unfortunately, the idea is still in the clouds.

I'm not knocking Talisman. I think it's a terrific idea, one of several futuristic initiatives hatched in Microsoft's 5-year-old group. (Abstracts of 10 papers presented at SIGGRAPH are available at www.microsoft.com.) But like many big ideas, victory may take longer than planned. Meanwhile, play it safe and keep close tabs on Talisman's progress. If it works, Talisman could change networks the way PCs changed corporate computing.

Buerger is a networking industry consultant and writer in Atlanta. He can be reached at dave@buerger.com.



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GENERAL CONFERENCE

The NetWorld+Interop three-day General Conference allows you to choose from several concurrent tracks, enabling you to customize your educational needs and schedule. Pick and choose your program from the schedule below. Visit www.interop.com for details on each session.

Wednesday, September 18

Time	Code	Session Title
10:15 am–11:45 am	C1	Virtual LANs (VLANs)
	C2	Low Cost ATM WAN Access Is Here
	C3	Considerations for Deploying NT Systems as Distributed Applications Servers
	C4	How to Cope Without Firewalls
	C5	Faxing for Free
2:00 pm–3:30 pm	C6	Designing High-speed LANs for High Throughput
	C7	Can ATM Networks Scale?
	C8	The Future of Routing
	C9	Supporting voice LAN and CTI with TSAPI and TAPI
	C10	In Perspective: CATV and the Internet
4:00 pm–5:30 pm	C11	FDDI: Still Going and Going and...
	C12	Switched and ATM LANs: Complementary or Competitive?
	C13	Satellite Futures for Networking
	C14	SNA and TCP/IP Coexistence: Companies Dealing with a Merger of Equals
6:00 pm–8:00 pm	SS1	ISDN v. CATV—A Great Debate
	SS2	ATM Switching Test and Evaluation Results

Thursday, September 19

Time	Code	Session Title
10:15 am–11:45 am	C15	High-speed Network Testbed Results
	C16	Using ATM in the Real World Today
	C17	In Perspective: IPv6 Transition
	C18	Building and Managing the InteropNet
	C19	Mobile Networking: Maintaining Your Network Identity as You Roam
2:00 pm–3:30 pm	C20	Token Ring Switching
	C21	ATM: Close Enough to Separate Hype from Hope?
	C22	In Perspective: Email on the Intranet
	C23	In Perspective: Making the Internet More Secure
	C24	CTI and Telecommuting
4:00 pm–5:30 pm	C25	Firewalls and the Future of Internet Security
	C26	Be Ready for Renumbering
	C27	LAN Desktop Videoconferencing
	C28	Fibre Channel and HIPPI
6:00 pm–8:00 pm	SS3	Network Industry Consolidation: Is it Good for You?
	SS4	ISDN Router and Bridge Evaluation Results

Friday, September 20

Time	Code	Session Title
10:15 am–11:45 am	C29	Switching in a Routed World
	C30	Gigabit Ethernet: The Next Campus Backbone of Choice?
	C31	Filters, Bots and Ferrets... How to Manage and Cope with Messaging Agents
	C32	The Ultimate in Wireless
2:00 pm–3:30 pm	C33	Hello to the Wide World of ATM: Good-bye to the Narrow World of TDM
	C34	WinSock Stacks—Sorting Through the Confusion
	C35	RMON 2: End-to-End Management of the Enterprise Intranet
	C36	SNA Migration to Frame Relay

1-DAY WORKSHOPS

Workshops are 1-day classes with a pragmatic focus. They explain "what is" (800 series) or "how to" (900 series), and are taught by implementors or developers of the technology in question.

Wednesday, September 18 • 9am–5pm

Code	Session Title
W804	IPng: The Next-Generation Internet Protocol *Dr. Steve Deering, Xerox Palo Alto Research Cntr.*
W831	Token Ring Switches and RFC 1490 FRADs in IBM Nets *Anura Guruge, GuruTech Consulting*
W833	Introduction to Wireless Computing *Veronica A. Williams, ACT Inc.*
W840	Internet Plug-and-Play with DHCP *Dr. Ralph Droms, Bucknell University*
W865	Distributed Object Computing *David Chappell, Chappell & Associates*
W993	Email Integration in Enterprise Networks *Michele Rubenstein, U.S. Treasury Department*

Thursday, September 19 • 9am–5pm

Code	Session Title
W810	PNNI Routing for ATM Networks *Ross Callon, Bay Networks Inc.* *Joel Halpern, Newbridge Networks Inc.*
W892	IPX Internetworking *Philippe Auphelle, I.R.C.I. Ingenierie Recherche Conseil Informatique S.A.* *Dr. Radia Perlman, Novell Inc.*
W910	Design and Optimization of Data Communciations Networks *James D. McCabe, Full Spectrum Communications L.L.C.*
W941	NetWare to Internet Gateways *James E. Gaskin, Gaskin Computer Services*
W945	How to Plan, Build and Implement a Network and Systems Management Center *James A. Taylor, OnSource Consulting Inc.*

TUTORIAL SESSIONS

The tutorials are designed to provide a thorough understanding of theory and/or practice in selected technology areas. Tutorials are in-depth 2-day classes taught by leading researchers, academics, technologists and consultants. Most attendees who register for a two-day tutorial take advantage of our special conference/tutorial packages. Visit www.interop.com for more details on each tutorial.

Monday–Tuesday, September 16–17 • 9am–5pm

Code	Session Title
T100	Introduction to TCP/IP and Internetworking *Dr. Douglas E. Comer, Purdue University*
T101	Network Architectures and Protocols *David Chappell, Chappell & Associates*
T103	PC Technologies for Networking and Internetworking: Enterprise Solutions *Dr. John T. Korb, Purdue University*
T104	Building Networks with ATM and Switching Technology: Practical Implementations *Nicholas J. Lippis III, Strategic Networks Consulting Inc.*
T105	Internetworking ISDN *Dory Ethan Leifer, The University of Michigan*
T120	FDDI: Protocol, Tuning, Applications and Installation *Mark Wolter, National Semiconductor Corporation, LAN Division*
T122–M	Future LAN Technologies: High-speed, Switching, ATM and Virtual LANs *Dr. Peter Tomsu, Cisco Systems Europe*
T123	ATM Technology and Implementation Strategies *Eckhart Eichler, PRO IN Consulting*
T140	Simple Network Management Protocol for Internet Network Management *Dr. Jeffrey D. Case, SNMP Research Inc.* *David L. Partain, SNMP Research Europe*
T141	Practical Network & Systems Management: Platforms, Tools & Frameworks *John W. McConnell, McConnell Consulting Inc.*
T201	Designing, Building and Managing Bridge and Router-based Data Networks *Scott O. Bradner, Harvard University*
T202	Designing and Implementing SNA Internetworks *Robert Deutsch, Cisco Systems Inc.*
T203	Internetworking with AppleTalk *Tom Coppeto, Massachusetts Institute of Technology*
T204	Evolving Ethernet: Switched Ethernet, 100BaseT and 100VG-AnyLan *Dr. Nick McKeown, Stanford University* *My T. Le, University of California, Berkeley*
T230	Mobile Data and Wireless LAN Technologies *Dr. Rifaat Dayem, Altamont Research*
T241	TCP/IP Administration for UNIX Systems *Craig Hunt, National Institute of Standards and Technology*
T242	Sendmail: Theory and Practice *Frederick M. Avolio, Trusted Information Systems Inc.*
T281	The Domain Name System (DNS) and Internet Naming and Directory Services *Dr. Paul V. Mockapetris, @Home Inc.*
T301	Theory of Bridges and Routers: Internetworking Protocols *Dr. Radia Perlman, Novell Inc.*
T303	Gigabit and ATM Network Architectures *Dr. Craig Partridge, BBN Corporation*
T304	Building Scalable & Resilient Internetworks Using OSPF and BGP-4 *Eural Authement, Bay Networks Inc.*
T320	Everything You Need to Know about Protocols to Enhance Network Performance *Dr. David Clark, Massachusetts Institute of Technology*
T321	Hot Topics in Networking *Dr. Raj Jain, Ohio State University*
T322	High-speed Networks: LANs, Switching, Host Interfaces & Multimedia Networking *K. K. Ramakrishnan, AT&T Research* *Henry Yang, Digital Equipment Corporation*
T342	Network Security: Principles and Protocol Standards *Dr. Stephen Kent, BBN Corporation*
T343	Network Security: Kerberos and Other Authentication Systems *Jeffrey I. Schiller, Massachusetts Institute of Technology*
T400	Enterprise Networks: Architecture and Planning *Peter Sevcik, Northeast Consulting Resources Inc.*

Thursday–Friday, September 19–20 • 9am–5pm

Code	Session Title
T106	ATM and IP: Theory and Practice *Dr. Douglas E. Comer, Purdue University* *Dr. Paul V. Mockapetris, @Home Inc.*
T122-F	Future LAN Technologies: High-speed, Switching, ATM and Virtual LANs *Dr. Peter Tomsu, Cisco Systems Europe*
T162	Clients and Servers: Understanding Packets, Ports, Sockets, Processes and RPC *Dr. Vince Russo, Purdue University*
T170	Understanding Networked Multimedia *François Flückiger, CERN*
T200	Taking Control of the Expanding Wide Area Network *Dr. James A. Metzler, Strategic Networks Consulting Inc.*
T243	Joining the Internet Safely Using UNIX and Firewalls *Tina Darmohray, Information Warehouse! Inc.*
T290	Networking with NT and Windows *John Lewis, Lewis and Associates*
T302	TCP/IP: Implementation and Internals *Dr. Ralph Droms, Bucknell University*
T305	Internet Multicast and Multimedia Technologies: The MBone, RTP and RSVP *Dr. Lixia Zhang, Xerox Palo Alto Research Center* *Dr. Deborah Estrin, University of Southern California* *Dr. Steve Deering, Xerox Palo Alto Research Center*
T344	Advanced Topics in SNMP: SNMPv2 *David L. Partain, SNMP Research Europe* *Dr. Jeffrey D. Case, SNMP Research Inc.*

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